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A Framework for Evaluating the Usability of Political Web Sites: Towards Improving Cyberdemocracy

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Declaration of Author's Right

Abstract

The use of the World Wide Web (WWW) for political purposes, sometimes known as Cyberdemocracy, is growing rapidly. Web sites in particular have potential in improving people's participation in politics; which is one of the basic principles of democracy. However, currently very few studies have focussed on the usefulness and effectiveness of such web sites. This research, therefore, investigates the issue of web usability and proposes a framework for evaluating the usability of web sites particularly political web sites. It also highlights the potentials of the Internet technology as an effective political communication medium and emphasises the need for proper design, maintenance, and evaluation of web sites in order to improve their effectiveness.

The research began with a literature search on web usability where seven major factors were identified namely Screen Appearance, Consistency, Accessibility, Navigation, Media Use, Interactivity, and Content - leading to the formation of a model called SCANMIC. Further exploration was conducted to elicit criteria relevant to each factor. The criteria and the model were then commented on and verified by experts in related fields. An online survey was carried out to identify the importance of these criteria from the perspectives of Internet users. Additional criteria which affect the usability of political web sites were also identified through interviews with frequent visitors of political web sites and web developers, and through content analysis of twenty political web sites in four different countries: Malaysia, United States, United Kingdom, and Australia. The findings from the usability criteria elicitation, expert reviews, survey and web content analysis resulted in a comprehensive list of web usability criteria, which formed the basis of the evaluation framework.

The framework was based on a benchmarking approach; an approach that has proven its success in the business area but not widely used in web evaluation. It proposes eight cyclical steps for benchmarking web usability, including - decide what to benchmark, determine what to measure, identify who to benchmark against, identify who will benchmark, perform the benchmark, analyse data and determine gap, redesign, and monitor progress. The framework can be used to benchmark the overall usability of any types of web sites but is particularly suitable for political web sites. Furthermore, it can guide people with technical or non-technical background, who intend to benchmark the usability of their web sites against others. It is a very useful tool for an organisation to identify any gap which might exist between the usability of its web site and those of its competitors. The framework was tested for its applicability and practicality on several major political web sites in Malaysia, a developing country with a fast growth in terms of Internet access. The outcome of the testing was used to refine and finalise the framework.

Research limitations are discussed in the last chapter and for each limitation, a suggestion for future studies is proposed. For example, there is an urgent need for a computerised tool to assist the benchmarking process. Testing the applicability of the benchmarking framework on other types of web sites also calls for future investigations. In addition, extending the applicability of the framework to include small displays technologies such as mobile phones and hand-held devices requires urgent attention.

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Chapter One

Research Background and Contributions

1.1 Research Rationale

The central focus of the debate on the success of a democratic political system is the participation of people in elections, political discussions, and the process of governance. In order to participate effectively, people should possess sound knowledge about political and social issues affecting them. Traditionally, people are mostly dependent on mass media, mainly newspapers, magazines, television and radio, as sources of political information. Indeed, the mass media has been very influential in shaping public opinion about political and social issues in any democratic country. Today, the advent of the Internet, however, has revitalised the whole concept of communication media. Ideally, it not only provides an alternative source of political information, but it can also be used as an effective political communication medium between and among citizens,

public leaders and political parties. This development provides opportunities for the enhancement of democracy whose main emphasis is on citizens' freedom to participate actively in politics by debating and exchanging views on key social and political issues.

The use of the Internet for political purposes has been growing rapidly over the years. Political parties, non-profit organisations, pressure groups and government agencies have been utilising the Internet as a political communication medium with the public since mid 1990s. Nowadays, debates and discussions on key social issues can already be conducted on-line. This development is more apparent in the United States (US) and several other developed nations including the United Kingdom (UK), Australia and Netherlands. This development is often known as Cyberdemocracy, which refers to the use of the Internet as a political communication medium. Examples of the Cyberdemocracy efforts in various countries will be discussed later in chapter 2.

Recently, there is evidence that the number of political web sites in cyberspace has been growing. Political web sites are developed for various reasons. Political parties, for example, use web sites mainly to attract and gain more supporters to win elections. Non-profit organisations, on the other hand, might aim at inviting the public to actively get involved in debates on current social issues. In contrast, governments' web sites would aim at providing faster and cheaper access of government information to business and citizens. Once again, this development theoretically provides opportunities for the improvement of democracy in the process of governance and decision-making.

Despite abundance of political web sites currently available, there are very few studies on their usefulness and effectiveness. Any effort to invite people to participate in politics through web sites will be less effective if the site has major usability problems such as poor navigation, unstructured contents, broken links and long downloading time. When the usefulness of the web sites is in question, it could jeopardise opportunities to promote Cyberdemocracy.

The success of web sites depends on many factors including usability, which is one of the most important factors. Usability could contribute significantly towards the usefulness and effectiveness of web sites. Web usability not only relates to the need for providing useful web contents but also elements of web designs that make sense to people who use them. Various studies show that web usability problems have caused firms a lot of money as well potential customers (e.g. Rowland, 2000; Seminerio, 1998). In various articles in his famous Alertbox web site[1], Jacob Nielsen, one of the web usability 'gurus' who has been conducting usability studies for many years, states that the failure of many commercial web sites is due to their usability problems. Thus, extending and applying the methodologies and findings of Nielsen and other researchers to other less studied areas would be beneficial as most web usability studies (e.g. Nielsen, 1997; Simeon, 1999; Abel, White & Hahn, 1999; Zimmerman, 1998; Misic & Johnson, 1999; Miles, Howes & Davies, 2000) have so far only concentrated on commercial and educational web sites.

1.2 Research Focus

Cyberdemocracy refers to the use of the Internet as political communication medium (Clift, 1997; Alexander & Grabbs, 1998). Various Internet applications are available for this purpose including the World Wide Web (WWW). The WWW, has recently become very popular partly because of its ability to merge or link several Internet applications such as file transferring and downloading, emailing, net chatting and net conferencing into *one single web site*. This means that apart from browsing its content, web surfers who visit a political web site would also be able to perform other functions including sending emails to political leaders, joining political discussion in electronic forum (e-forum), downloading files, chatting with others about social issues, watching political conferences on web television, and listening to political speeches on net radio. Because of this, web sites have great potential in contributing towards improving people's participation in politics.

[1] Available at http://www.useit.com

To date, there are many political web sites available in the cyberspace. Many countries in the world especially those that practise democratic political system such as the United States, United Kingdom, Australia, and Malaysia has allowed and encouraged political parties, non-governmental organisations, and government agencies to utilise web sites as a communication medium with the public. However, as mentioned earlier, there is a lack of studies that concentrate on the effectiveness of these political web sites. With this in mind, this research therefore, *concentrates on the effectiveness of web sites used as political communication medium, with the main focus on usability issues*. Since political web sites consist of at least four different types (i.e. political parties, non-profit organisations, government agencies, and individuals) with different purposes, this research concentrates centrally on the *generic usability criteria that are applicable to all these types of political web sites.*

As there are many devices available for accessing the Internet (for example, Personal Computers (PC), hand-held computers, mobile phones, and digital television), this research would only focus on the web usability issues of PC-based or desktop users. In addition, the scope of this research is also limited to users without any physical impediment (i.e. users that don't require special devices to access the Internet). Undeniably, usability issues for people with disability are very important, but they are outside the scope this research.

1.3 Research Questions and Objectives

Meeting users' needs and expectations has been one of the most important elements in developing a computer system. Users' needs vary according to the nature and environment of the systems being developed. For instance, in an Internet environment, users' expectations are diverse due to its on-line characteristics. The Internet can be accessed by any user from any age group, race, nationality and gender all over the world at any time and any place. To address issues of such nature, experts in Human Computer Interaction (HCI) and Usability have introduced various design guidelines, which are aimed at improving the usability and effectiveness of web sites. However, many of these guidelines are "context-free" (i.e. applicable to any type of web sites) (Pejtersen

et al., 1999). There are, of course, a number of "context-specific" guidelines, but very few focuses on political web sites. The existing published guidelines mostly concentrate on commercial and educational web sites.

Considering these issues, this research answers four major ***questions***;

a) **What are the key generic criteria of web usability?**

Before focusing on the usability issues of political web sites, it is very important to look into the main criteria of web usability in general. Although there are many types of web sites developed for different purposes, they have some similarities in terms of, for example, the navigation system, colouring scheme, text and topology scheme, and the use of interactivity features. This research will uncover the key generic criteria (both objective and subjective) that affect all types of web sites.

b) **What are the key generic criteria that affect the usability of political web sites?**

Web sites are published for various reasons and for different target users. Companies use them to promote and sell their products to potential and regular customers; academic institutions use them for academic related purposes that benefit their students and staff; government departments use them to disseminate public information to the general public; and political parties use them to gain more supporters.

Because there are so many types of web sites and target users, the usability criteria for a particular type of web site might be different from others. For example, users of e-commerce sites rate credit card security as the most important usability factor (Tilson et al., 1998), whereas users of academic web sites rate useful content as the highest usability criteria (Abels et al., 1997). This research will identify the key criteria that specifically affect the usability of political web sites.

c) **How important are these criteria from the perspectives of the users?**

Users play a central role in determining the success of web sites. They are the ones who decide on whether to visit and fully utilise a particular web

site or go away for good. It is in this respect that the usability concept comes into existence. Therefore, this research will identify the importance of the criteria described in (a) from the perspective of the users.

Usability is about aspects of web design and contents that make sense and meet the expectations of users. Various studies show that usability problems could lead to the failure of web sites. Spool's usability study of 15 large commercial web sites, for example, reveals that the users who were given specific tasks during the testing, could only find 42 per cent information within the specified time (Nielsen, 1998). Zona Research found that 62 per cent of web surfers have given up looking for the item they wanted to buy on-line (Seminerio, 1998). Another example is the study by Forrester Research on 20 major web sites where it was found that on average, each site violates at least 50 percent of simple web usability principles (Nielsen, 1998).

Nevertheless, the usability criteria and their relative importance may differ between various types of web sites and user environments. As Brown and Degenhart quote;

> *In designing web sites, you can't necessarily trust your intuition. Sometimes you have to consult your audience (Brown & Degenhart, 1998).*

This is why usability testing and web evaluation involving potential users are necessary.

As such, this research will not only identify the generic criteria of web usability but also their relative importance from the perspective of the Internet users.

d) How can the criteria identified in (a) and (b) be used to evaluate the usability of political web sites?

Despite many web design and evaluation guidelines available today, very few address the issue of political web sites' usability. Most of these guides,

for example, Yale Web Style Manual for WWW Interface Design[2], Web Content Accessibility Guidelines 1.0[3], and Jacob Nielson Design Guidelines[4], only concentrate on general design principles for all types of web sites. Furthermore, some guidelines are too rigid (e.g. use not more than 7 main menus) or too vague (e.g. use conservative colours) (Cunliffe, 2000), and in some cases too technical for novice designers (e.g. use about 15 fps for animation clips).

Similarly, not many researchers focus on identifying the usability problems of political web sites. As a result, there is no clear picture on how the evaluation of political web sites could be carried out. In dealing with this question, this research will propose a framework for evaluating the usability of political web sites.

In order to answer the above research questions, the research *objectives* are formulated as follows:

a) To identify key generic criteria of web usability from the perspective of web usability experts;
b) To identify key generic criteria which affect the usability of political web sites;
c) To rate the importance of each generic web usability criteria from the perspective of the Internet users;
d) To design a framework for evaluating the usability of political web sites, which can be used by both technical and non-technical people who are involved in political web site development, and;
e) To test the applicability of the proposed framework using samples from one nation (i.e. Malaysia).

With respect to objective (e), Malaysia was chosen as the research base. The Malaysian government has invested heavily in its Multimedia Super Corridor

[2] http://info.med.yale.edu/caim/manual/interface.html
[3] http://www.w3.org/TR/1999/WAI-WEBCONTENT-19990505/
[4] http://www.useit.com

(MSC) project. With the latest Information Technology infrastructure, the introduction of the Digital Act that allows free flow of information through the Internet and more people getting access to the Internet, Malaysia has the potential to become one of the nations that practise Cyberdemocracy effectively. Using the proposed framework, the level of usability of political web sites in Malaysia is measured.

1.4 Original Contributions and Significance of the Study

The outcomes of this study would contribute significantly to our knowledge in the area of web design and evaluation. In addition, it would also contribute towards improving public participation in politics, and provides the basis for future research in web evaluation, Cyberdemocracy, and other related areas. The following sub-sections discuss in more depth some possible contributions.

1.4.1 Contribution to Knowledge

Many believe that Cyberdemocracy provides a way for improving the democratic process (e.g. Alexander, 2001; Poster, 1995; Rheingold, 1993). However, there are many factors that may contribute towards its success, for example, the usability of political web sites, which is the focus of this research. The contributions of this research to knowledge are at least, threefold:

- *An identification of generic criteria for web usability;*
- *An explanation of how these generic criteria can be applied to web design particularly the design of political web sites, and;*
- *A framework of how these criteria can be used to benchmark and evaluate web sites.*

In order to perform evaluation, evaluators must know the generic criteria that affect the usability of the web sites. This research will not only identify the generic criteria of web sites, but also classify them into categories of factors,

so that differences between each criterion are clear and priority can be imposed by web designers and evaluators.

In designing the framework for evaluating political web sites, this research combines the generic usability criteria identified through the literature and guideline reviews with the criteria identified from surveys. This resulted in the classification of the usability criteria that specifically affect the political web sites. Furthermore, this research also highlights the degree of importance for each usability criteria based on the findings from the survey.

The framework to be developed in this research can be employed by designers of different skill levels in evaluating web sites. Among the expected advantages of this framework are as follows:

- it can be used by both technical and non-technical users and web designers ;
- it requires only limited number of evaluators;
- it can be carried out within a short period of time;
- it can be used during both design or redesign processes of web sites, and;
- it can be used to identify the level of usability of one's web site against those of competitors.

1.4.2 Contribution to Government and General Public

The outcome of this research highlights the potential of Cyberdemocracy and how the Internet technology can be utilised for political purposes. It indirectly creates awareness among politicians, government leaders, and public leaders on the importance of the Internet technology as a medium for promoting political agenda and social issues. It also stresses the need for proper use and design of political web sites to ensure its effectiveness.

When political web sites are being evaluated properly from time to time, the level of usability and its usefulness could improve. This means that the general public could enjoy better and more useful web sites. This would then attract more people to participate in politics through the Internet.

1.4.3 Future Research

There are a lot of rooms for future research in the area of Cyberdemocracy. This research only tackles the issue of web site usability as a contributory factor towards improving Cyberdemocracy. Other factors such as attitude, culture, the general level of IT literacy, and Internet accessibility are not considered. However, the outcome of this study could offer new idea and provide necessary background to research in the area of Cyberdemocracy.

1.5 Thesis Structure

This thesis is divided into eight chapters including chapter one that presents the rationale and background of this research. Chapter Two provides the literature review, which is divided into four main parts - Internet and Democracy, definitions of web sites, the concept of web usability, and past research on web usability evaluation.

Research methodology is presented in chapter three. This chapter begins with the definitions of the concept of 'evaluation', as well as the explanation of stages and styles of evaluation. Then, some common methods used in usability evaluations are critically reviewed. The second part of this chapter explains the methods used in this research including criteria elicitation, expert review, survey, and web sites content analysis.

Data analysis and research findings are covered in chapters four, five, and six. These chapters present the findings from the criteria elicitation and expert review, online questionnaire, interview with the Internet users, interview with political web site developers, and content analysis of political web sites.

Chapter seven presents a framework for web evaluation, which is one of the main outcomes of this research. The framework is divided into two – the general framework for assessing general web sites and the framework designed specifically for evaluating political web sites. This chapter also discusses the framework testing on political web sites in Malaysia.

Finally, the general outcomes of this research in terms of its strengths, limitations, implications on the concept of democracy and Cybedemocracy and conclusions are presented in chapter eight. The potential area for further research is also discussed in this chapter.

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Chapter Two

Cyberdemocracy and Web Usability: Literature Review

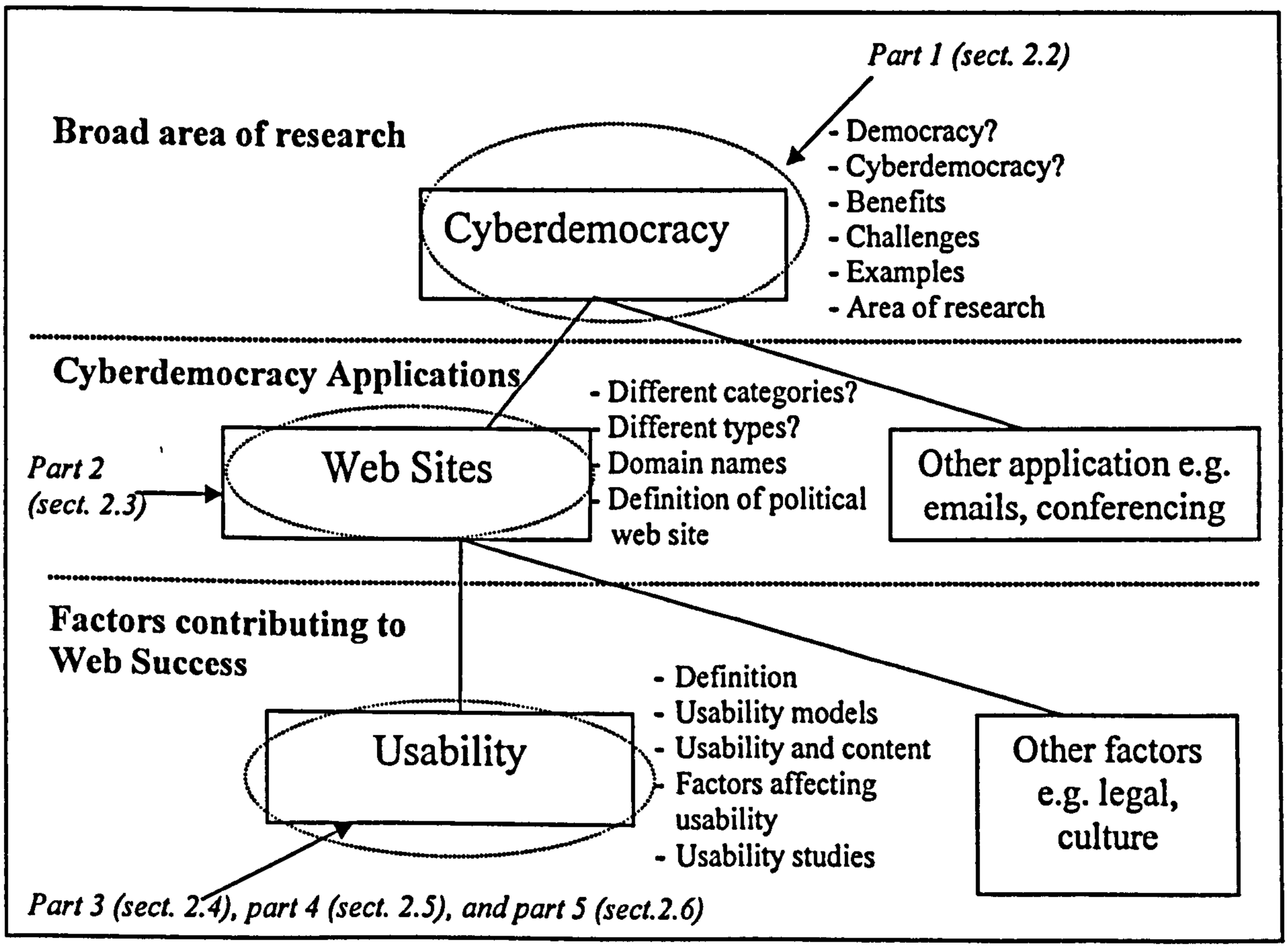
2.1 Introduction

Since the main focus of this research is on the usability of political web sites, several related concepts including *Cyberdemocracy, web sites, and web usability* need to be defined clearly.

The first part of this chapter (section 2.2 and its sub-sections) begins with the description of the concept of democracy and Cyberdemocracy. Then, it follows by a brief explanation on the potential benefits and challenges of Cyberdemocracy. Some examples of current Cyberdemocracy efforts are also presented. Definition of web sites and their various categories including

political web sites are explained in part 2 (section 2.3 and its sub-sections). Detailed review and analysis on the concept of web usability are presented in part 3 (section 2.4 and its sub-sections) which includes a review on usability models, and the relationship between usability, user-interface, and content. Part 4 (section 2.5 and its sub-sections) discusses factors affecting web usability by reviewing several web design guidelines. The formation of a new usability model called SCANMIC is also described in this part. Finally, part 5 (section 2.6) summarises a number of past studies related to web usability. The logic on the structure of this chapter is explained diagrammatically in figure 2.1.

Figure 2.1: Presentation Structure for chapter 2



2.2 Internet and Democracy

2.2.1 What is 'democracy'?

"Democracy" is derived from the Greek word "demokratis", where "Demos" means "the people" and "kratia" means "power" (WWWebster Dictionary, 1999). In short, "democracy" means "power of the people". The basic principle of a democratic theory is that any government should be "of the

people, by the people, and for the people." According to WWWebster Dictionary, democracy is:

> *...a government in which the supreme power is vested in the people and exercised by them directly or indirectly through a system of representation usually involving periodically held free elections (WWWebster Dictionary, 1999).*

The trend in today's democracy however rests on the principle of a representative government where people will elect their representatives to form a government. It is impossible to practice direct democracy because it requires every citizen to participate actively in the democratic process. The reason direct democracy was possible in Athens was because of its tiny population and only free people and male citizens could vote. Due to the fact that people have to choose their representatives, there are certain requirements that need to be fulfilled by the government to preserve democracy. One requirement is the right of people to possess knowledge or to be informed (Beer, 1999; Keenan et al., 1999). Apart from candidates' background, vision and mission - knowledge here also refers to their works, activities and progress once they are elected. Information is a key towards making proper decision. People should have enough information to make decisions and to participate in the democratic process. There must be freedom of speech and no element of government control is allowed in any communication media. Mill argues:

> *We may then ask, if there are any possible means by which the people can make a good choice, besides liberty of the press? The very foundation of a good choice is knowledge. The fuller and more perfect the knowledge, the better the chance, where all sinister interest is absent, of a good choice. How can the people receive the most perfect knowledge relative to the characters of those who present themselves to their choice, but by information conveyed freely, and without reserve, from one to another? (Mill, 1967, p.19).*

Apart from the right of people to know, accuracy in information is also an important component in the democratic process. Accurate information is

required not only for electing the best representatives but also to evaluate them throughout their serving periods. If the representatives abuse their power, then citizens have the ability to replace the abusers. Mill argues:

> *That an accurate report of what is done by each of the representatives, a transcript of his speeches, and a statement of his propositions and votes, is necessary to be laid before the people, to enable them to judge of his conduct, nobody, we presume, will deny. This requires the use of the cheapest means of communication, and, we add, the free use of those means. Unless every man has the liberty of publishing the proceedings of the Legislative Assembly, the people can have no security that they are fairly published (Mill, 1967, p. 20).*

Another requirement for a true representative democracy concerns with the right of people to voice opinion (Hirst, 1998; Beer, 1999; London, 1995). This is to say that people should have freedom of discussions about politics and key social issues. People who have adequate knowledge of the defects of a government should be allowed to voice their opinions with supported evidence and arguments. Likewise, if any citizen who disapproves this opinion should also be allowed to justify his or her opinion. Mill argues:

> *Where the rulers are willing, but do not know how to improve the institutions of government; everything which leads to knowledge of their defects is desirable to both rulers and people. That which most certainly leads to such knowledge is, that every man who thinks he understands any thing of the subject, should produce his opinion, with the evidence on which they are supported, and every man who disapprove these opinions should state his objections* (Mill, 1967, p.28).

Since democracy is related mainly to the right of people to know the activities of the government and to voice out their opinion, communication media play a very important role to exercise these rights. This will be discussed in the next section.

2.2.2 Democracy, Communication Media and Control

Communication media play the key role in fulfilling the above mentioned requirements of democracy. Newspapers, magazines, televisions, radio, and other media are vehicles to protect people's rights and democracy, not the other way round. Rheingold argues:

> *...the idea of modern representative democracy as it was conceived by Enlightenment philosophers included a recognition of a living web of citizen-to-citizen communication known as civil society or the public sphere. Although elections are the most visible fundamental characteristics of democratic societies, those elections are assumed to be supported by discussions among citizens at all levels of society about issues of importance to the nation (Rheingold, 1993, p.11).*

The word 'public sphere' as mentioned above by Rheingold was introduced by the German political philosopher, Jurgen Habermas back in 1962. He defines the public sphere as part of public life where ordinary people exchange information and opinions freely regarding issues of public interest. Habermas writes:

> *By 'public sphere', we mean first of all a domain of our social life in which such a thing as public opinion can be formed. Access to the public sphere is open in principle to all citizens. A portion of the public sphere is constituted in every conversation in which private persons come together to form a public. They are then acting neither as business or professional people conducting their private affairs, nor as legal consociates subject to the legal regulations of a state bureaucracy and obligated obedience. Citizen act as a public when they deal with matters of general interest without subject to coercion; thus with the guarantee that they may assemble and unite freely, and express and publicise their opinions freely (Rheingold, 1999, p.2).*

Communication media play an important role in reshaping the public sphere from time to time, either towards strengthening or threatening democracy (Adhikari, 2000; Poster, 1995). In the past, people talked about politics in the

agora (market place), the coffeehouse, the tavern, the public square, and the town hall. Then, people began to rely on the mass media such as televisions and newspapers and now the latest communication technology ever invented emerges - the Internet, which allows some people to communicate freely even from their bedrooms.

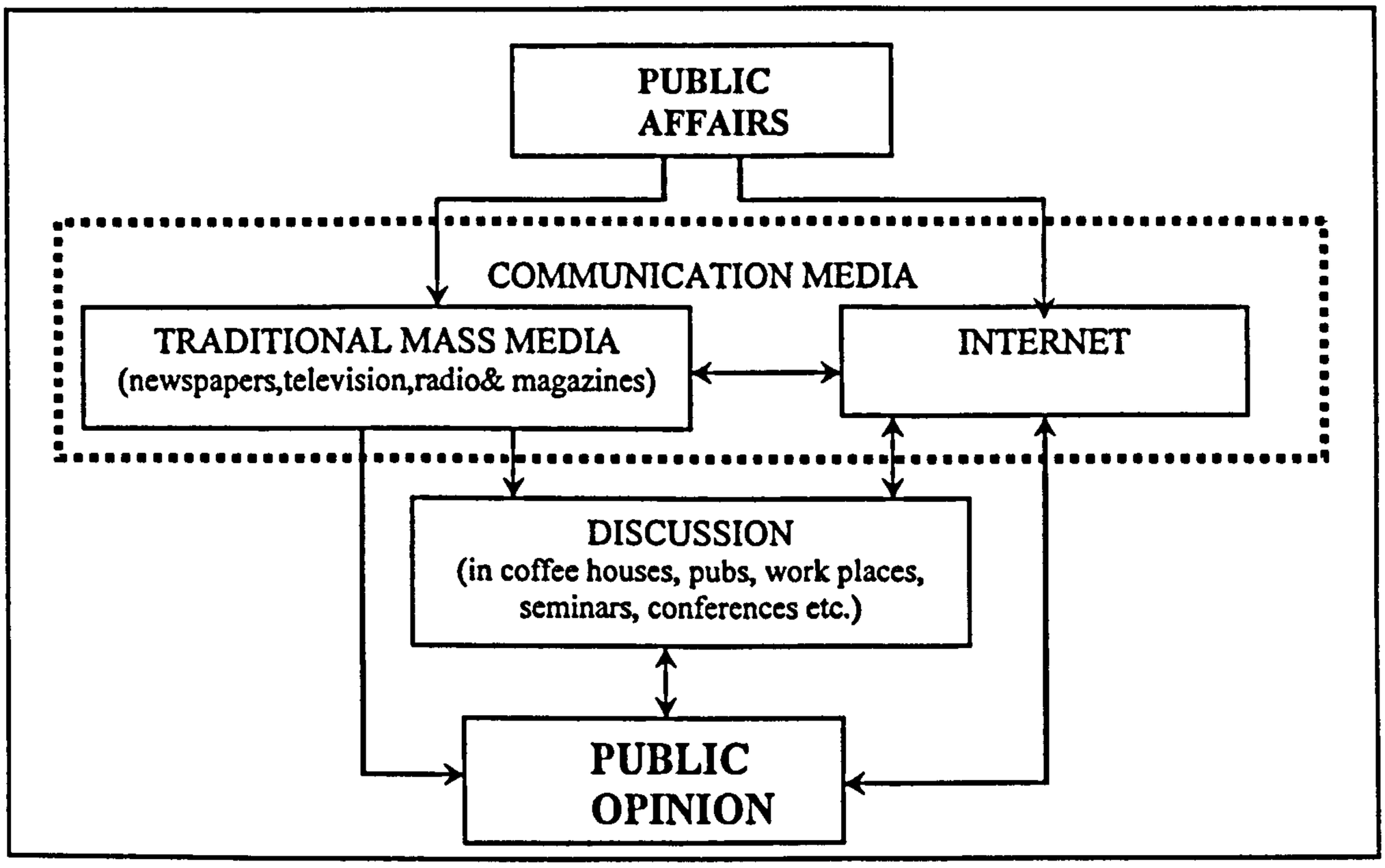
The main problem with the public sphere in the past especially in the eighteenth century was limited number of participants involved in discussions. Several factors contributed to this:

- Space limitations (not many people could gather in public gathering places such as the public square or town halls);
- Geographical barrier especially when transportation was still lacking, and;
- Poor technology in communication media which had resulted in lack of knowledge on political and social issues among the public.

The advance of the communication media technology however, has widened the concept of public sphere by allowing more people to participate in politics regardless of geographical boundaries and at the same time providing people with up-to-date political development throughout the country (Agres et al., 1998). More issues can be raised and discussed in newspapers, radio, television channels and the most recent one - the Internet. This development not only provides people with more sources of information but also allows them to get involved in discussions and debates on public issues.

Presented below is a model of political information flow to highlight the role of communication media in politics.

Figure 2.2: Simple Model of Political Information Flow



Sources: adopted and enhanced from Lenart (1994)

The above model is an enhanced version of Lenart's model of political information flow (Lenart, 1994). The original model as proposed by Lenart illustrates that individuals can obtain information about public affairs from two main sources - the mass media (televisions, newspapers, radio, and magazines) and through the outcome of public discussions. Recently, the Internet provides an extra medium through which people can access to information. Hence, as a new entity, the Internet is included in the model. This model shows that the information from the traditional mass media, the Internet and informal or formal public discussion have the potential to influence public opinion in the public sphere. In addition, there is also a two-way link between the traditional mass media and the Internet, thus illustrating:

- the growing development of on-line news, radio, television and magazines;
- that the traditional mass media can also play a key role in advertising and promoting web sites.

Despite its strengths, it has also been argued that communication media especially the mass media has threatened democracy. This argument is based on the fact that the media is normally being exclusively controlled by private organisations or the government and thus could jeopardise the people's

freedom of speech and opinion. Indeed, the communication media has the power to influence human perceptions and belief as well as to command and control. Therefore, in order to ensure that democratic principles are protected, the publishing power of media needs to be democratised.

Having said this, one should realise the fact that there is a trade off between freedom of communication and political stability. Free flow of information needs some form of control to preserve the interests of three entities in a society - the government, the private firms and individuals. Mulgan(1991) argues that free flow of information threatens a series of legitimate interests in controlling and restricting information. The oldest interest is that of the state in preserving national security. Then, the more recent interests are those of industry in protecting copyrights, patents and trade secrets, and the last one are those of the individuals in preserving rights to privacy.

A democratic government is formed by people through the electoral process to govern and protect the interest of a society. In order to protect the interests, for example, to maintain peace between citizens of different races, the government has to introduce some form of laws not to allow racist remarks in the mass media that could spark racial tension. Similarly, laws should also be formulated against the use of media for pornography, underground crimes, attacks on religious beliefs and other unlawful crimes. In this aspect, the media are used as controlling tools to protect a society against social destruction. Yet at the same time, there should be a limit of control to preserve the requirements of democracy. The government should not by any means stop the freedom of expression and people should be allowed to discuss and voice their opinion with regards to social and political issues affecting the nation. One example is the argument of whether sex education should be introduced at secondary schools.

Restrictions on free flow of information among society should also be imposed to protect the interests of private firms and individuals. Some information is a commodity that belongs to its creator or originator. Books, articles, journals and software are examples of information commodities that need copyright

protection. Protection should also be made against the invasion of individuals' privacy. For example, the government and private firms who normally hold background information of individuals such as birth date, address and telephone number should strictly maintain their privacy policy to protect the individuals' information.

From this argument, it can be seen that it is very difficult on the part of a government to maintain freedom of communication between and among citizens while at the time protect the interest of a society and national security. Controls over communication media within the public sphere should be carefully exercised so that the democratic principles such as freedom of speech and freedom to possess knowledge can be maximised. Mulgan(1991) once again argues:

> *Free flow is in practice ambiguous, equally able to liberate or to stabilize the structures that sustain autonomy and freedom, to spread misinformation, propaganda and deceit, or flow of legitimately private information (Mulgan, 1991, p.119).*

Nevertheless, the Internet has the potential to ensure that the publishing power of communication media can be democratised, which will be discussed, in the next section.

2.2.3 The Internet and Democratisation of Publishing Power

The advent of the Internet technology poses a strong challenge to the role of the traditional mass media (Adhikari, 2000; Agres et al., 1998). The mass media have been reshaping the public sphere and influencing the processes of governance for years. Government has been using the mass media as political tools in maintaining control and power. However, the main argument against the printed press and broadcasting technology such as television is that they only provide one-to-many communication channels, which hinder the free flow of information between and among government, private sectors and the public. Furthermore, the publishing power is controlled by a few people and companies such as businessmen, and printing and broadcasting companies.

This problem could be minimised through the use of the Internet because it provides opportunities for many-to-many communication and conversations regardless of geographical barriers.

Additionally, the Internet also offers the opportunities to democratise the publishing power of every citizen, who could now publish, inform, debate, and print any materials on the Internet. Rheingold argues:

> *Now that every PC connected to the net can be a printing press, broadcasting station, and a place of assembly, millions of citizens possess powerful new tools to publish, persuade, inform, investigate, organise, and debate (Rheingold, 1999, p.1).*

As the role of the traditional mass media continues to dominate, its influence could be reduced by the emergence of the Internet. That is why most of traditional media such as newspapers have now published their presence on the Internet. Apart from that, the Internet also redefines the concept of the public sphere by providing an additional means for exchanging views and opinion between people. Once again, Rheingold argues:

> *Communication technologies are political tools because the power to persuade and convince has grown to be even more effective than the power to coerce and kill as a means of gaining, maintaining, or overthrowing political power. The trend over the past five hundred years since the Gutenberg revolution has been toward the democratisation of information and communication technologies. That which had been the exclusive private property of powerful elites became the public social capital of populations (Rheingold, 1999, p.1).*

When the Internet is used as a political communication medium within a society, the concept of Cyberdemocracy emerges. The next few sections will discuss the definition of Cyberdemocracy, its potential benefits and challenges, and examples of current Cyberdemocracy practise.

2.2.4 The Definition of 'Cyberdemocracy'

There is little agreement on the exact definition of Cyberdemocracy because of its uncommon usage. Some writers prefer to use e-democracy or digital democracy rather than Cyberdemocracy. The prefix "cyber" is the Greek word for "steer" (WWWebster Dictionary, 1999), which implies that democracy will be 'steered' by the use of the Internet.

In defining Cyberdemocracy, Clift (1997) invites us to imagine a world where the only communication tools are paper and pens and there are three actors in this society - the business-media, the government, and the citizens. According to him, there is plenty of paper to go around. However, only the business-media and the government have pens and therefore the ability to distribute written words. In other words, only the government and the business media have the real power and voices in agenda setting in this world. He further argues that this is undemocratic and hence citizen-based electronic democracy is needed so that people would also be allowed to have pens. From this analogy, it can be said that Cyberdemocracy is about the use of online communication tools such as the Internet for many-to-many civic discussions between the government, business media and public. It is based on the belief that open communication and participation are the foundation of democracy.

Alexander and Grabbs (1998) describe Cyberdemocracy as the optimum use of Internet-based communication technologies by government agencies, interest groups and non-profit organisations to promote public participation in the process of governance.

In general, Cyberdemocracy can be defined as the use of Internet applications such as World Wide Web (WWW), file transferring, electronic mail (email), conference facilities, and net chatting for the dissemination of information, and the exchange of ideas about key social and political issues, between and among government, political parties and public leaders with the general public. This effort could be carried out by an individual, independent non-

profit organisations, government agencies, pressure groups, or political parties with the main objective of promoting public participation in politics.

The main focus of this research will be on the use of *web sites* as political communication medium because web sites have the abilities to integrate other Internet applications such as *emails, file transfer, conferencing, and net chatting.* Therefore, the word Cyberdemocracy in the context of this study will refer to *the use of web sites* as political communication medium.

2.2.5 Potential Benefits of Cyberdemocracy

Some political writers (e.g. Mazmanian, 1995; Rheingold, 1993; Yates & Perrone, 1998; Barbrook, 1998; Kurland, 1996; Resnick, 1997; Rawland, 1998) believe that the Internet could improve public participation in the democratic process. Traditionally, the most common way for the government to disseminate information is through the mass media such as newspapers, radio and televisions. The main problem with these media as mentioned previously, is that they provide only one way communication that hinder active participation from the public. Nowadays, the Internet technology offers an interactive medium through which the government and citizen could directly communicate (Etzioni et al., 1999; London, 1994). It is stated in the Communication Policy Briefing 4 (1996) published by Benton foundation that faster, cheaper, more diverse, and more interactive communications have shown great potential to increase citizen participation in the democratic process. Electronic email for example, allows constituents instant and direct communication with their on-line elected representatives. Whereas civil networks, provide local and government information at no cost to the public.

Apart from improving public participation in the political process, the Internet could establish direct links between government, political leaders and citizen at large (Claver et al., 1999; Dawes et al., 1998). Government departments have long been characterised by its bureaucratic nature of governance and hierarchical structure. Some political leaders and members of parliament lack accountability due to the communication gap. However, the Internet

technology such as email could theoretically flatten the hierarchical structure and improve the communication between government officials, politicians and the public. In practice, however, there is no clear evidence yet to justify the extent of which the communication gap between government officials, politicians and the public could be minimised through the electronic communication medium.

Some political writers admit the Internet represents one of the best communication media for citizens for equal and fast access of information regarding the governance of state, and other political and social issues (Mulgan, 1991; Agres et al., 1998; Adhikari, 2000; Ebersole, 2000). Theoretically, the Internet technology offers citizens the easiest and fastest medium for information retrieval. In the past, people have to travel to visit government agencies and face bureaucracy just to get information. Nowadays, with several keystrokes on the keyboard in a study room, an Internet user can get access to a wide range of governmental information from various databases and websites. In the United States, for example, the federal, state, and local governments are establishing their presence on the Internet. Sweet (1995) states that there are dozens of federal agencies that provide public information online through a service in Virginia called Fedlink. Fedlink acts as a gateway through which the general online public can reach any agency's system. In addition, he argues that local governments are increasingly establishing "FREENET", which are online information services open to the public. These services provide local government documents and news, and are a medium among callers to discuss local issues. Although Sweet's argument is more related to the United States politics, it demonstrates the potentials of the Internet to enhance Cyberdemocracy all over the world including less developed nations.

In Malaysia, the use of the Internet for political purposes is growing rapidly especially before the 1999 general election. Most political parties and independent organisations turn to the Internet as a medium to disseminate political information and promote public discussions because of the governments' tight control over the press, radio and television broadcasting.

According to the press freedom survey by Freedomhouse on 192 countries throughout the world, there are 14 countries in Asia with little freedom of the press including Malaysia (Freedomhouse, 2000).

Political web sites in Malaysia such as those belonging to Pan Islamic Party of Malaysia (PAS), Democratic Action Party (DAP), Party for Justice (KEADILAN), Malaysiakini, and dozen others were very active especially several months before the 1999 general elections[1]. The freedom of expression allowed on the Internet was fully utilised by the opposition parties to attack the ruling party on various issues affecting the nation. In retaliation, the government also published its presence on the Internet to counter-attack the oppositions' allegations and propaganda, for example, United Malay National Organisation's (UMNO) web site at http://www.umno.org.my. This example is a good indication of the development of democracy in Malaysia. Nowadays, people would be able to follow the political developments of the country not only from the perspectives of the government, but also from the opposition and independent organisations.

2.2.6 Potential Challenges to Cyberdemocracy Efforts

Despite its potential benefits, there are some challenges and limitations towards the realisation of the full potential of Cyberdemocracy. First, the issue of privacy and security. The use of the Internet technology to boost citizens' participation in the democratic process may intrude individual privacy. As the government and the business sector allow public access to information through the Internet, there is a danger of privacy intrusion due to information being stored in the electronic databases, which may contain personal information. There is always a conflict between someone and an organisation's right to know with an individual's privacy. A good example is the web site of Malaysian Election Commission (SPR) at http://www.spr.gov.my where one of its features is the ability for voters to check their names in the voting list and voting venues. In this case, users have to key in their identity card (ID) numbers and the site will process and display the results. This feature offers

[1] URLs for these sites - www.parti-pas.org, www.malaysia.net/dap/, www.keadilan.org, www.malaysiakini.com

the possibility of privacy intrusion whereby anybody who happens to know the ID numbers of others, would be able to retrieve very sensitive information.

Another potential challenge to Cyberdemocracy efforts is the activities of hacking on government agencies' web sites. Government agencies need to take serious effort to ensure securities of their databases and web sites, for example through the use of firewalls. According to Sweet (1995), a firewall is a second computer placed between an organisation's own computer and the Internet communication lines to help control access and prevent 'break -ins'.

Although the Internet is a potential vehicle for improving democracy, issues of accessibility of the technology should be addressed. Democracy is not only about freedom to access information but also about equal access among citizens (Keenan et al., 1999; Mazmanian, 1995; Kurland et al., 1996). If Cyberdemocracy can influence the policymaking process, its participants must come from the majority of the citizens or those who are eligible for voting. Otherwise the use of Internet technology in democracy might not be effective and even worse it might jeopardise the principle of democracy itself. Mazmanian (1995) argues that the issues of equity, universal service, and access are crucial in a democracy and will be more important as citizens come to depend more and more on electronic media for news and information. He further says that those who have access to the new technologies surely will have an advantage in affecting policy over those who will not be able to use them.

The Information Technology (IT) illiteracy among citizen could also be a potential limitation of Cyberdemocracy. Illiteracy in computers will result in people not knowing the use of or how to use computers. They would probably not spend money on buying computers and thus have no interest in getting access to the Internet. Cyberdemocracy might be implemented successfully in countries like the United States (US) because of its high number of Internet users. It is reported that 83 million adults or 40 per cent of the US population

over 16 are accessing the Internet[2]. Whereas in Europe, the United Kingdom has the highest number of Internet users with 27 percent of its adult population use Internet service in 1999 (Computer Industry Almanac, 1999). Other countries still have very low Internet users including most countries in South East Asia. Having said this, the problem of computer and Internet literacy is decreasing since the growth of Internet usage has been rising tremendously everyday. The number of Internet users world-wide is expected to grow to 765 million by 2005 from 490 million in 2001, where the greatest growth will be in Asia and South America[2].

It is also worth noting that the issue of public attitude towards democracy and indeed Cyberdemocracy could also play a key role in the success of its implementation. 'Who cares' attitude among some of the public for example, might defeat the objective of Cyberdemocracy. It is not easy to invite people to participate in Cyberdemocracy due to its voluntary nature. They might have various reasons not to participate including too busy and too tired. This means that efforts to invite people to use the Internet in participatory democracy should also be accompanied by efforts to educate people on the importance of their participation in politics.

The arguments so far show that there are many issues related to Cyberdemocracy. These are among the factors that need to be taken into consideration by those involved in Cyberdemocracy efforts. The intention of this research, however, is not to study the issue of privacy intrusion, hacking activities, technology accessibility, information illiteracy, public attitude or many other factors involved. Instead, it concentrates on another equally important issue, which is the usability of political web sites that will be discussed at length in section 2.3, 2.4, and 2.5.

Being a major component of Cyberdemocracy, political web sites should be 'usable' to contribute towards the success of Cyberdemocracy. Indeed, the Internet offers a lot of potential as a new interactive communication medium

[2] Statistics available at http://cyberatlas.Internet.com

with multimedia capability, but its effect also depends on how it has been utilised. If a political web site is merely a conversion of hard copy brochures into electronic versions, it may not be as effective as it is intended for.

Having said this, there are many examples of Cyberdemocracy efforts undertaken by governments, political parties, pressure groups, non-governmental organisations, and even individuals in many parts of the world. Although the level of success of these initiatives remains unclear, they offer an alternative medium for the public to get involved in politics. Next section will present some examples of these initiatives.

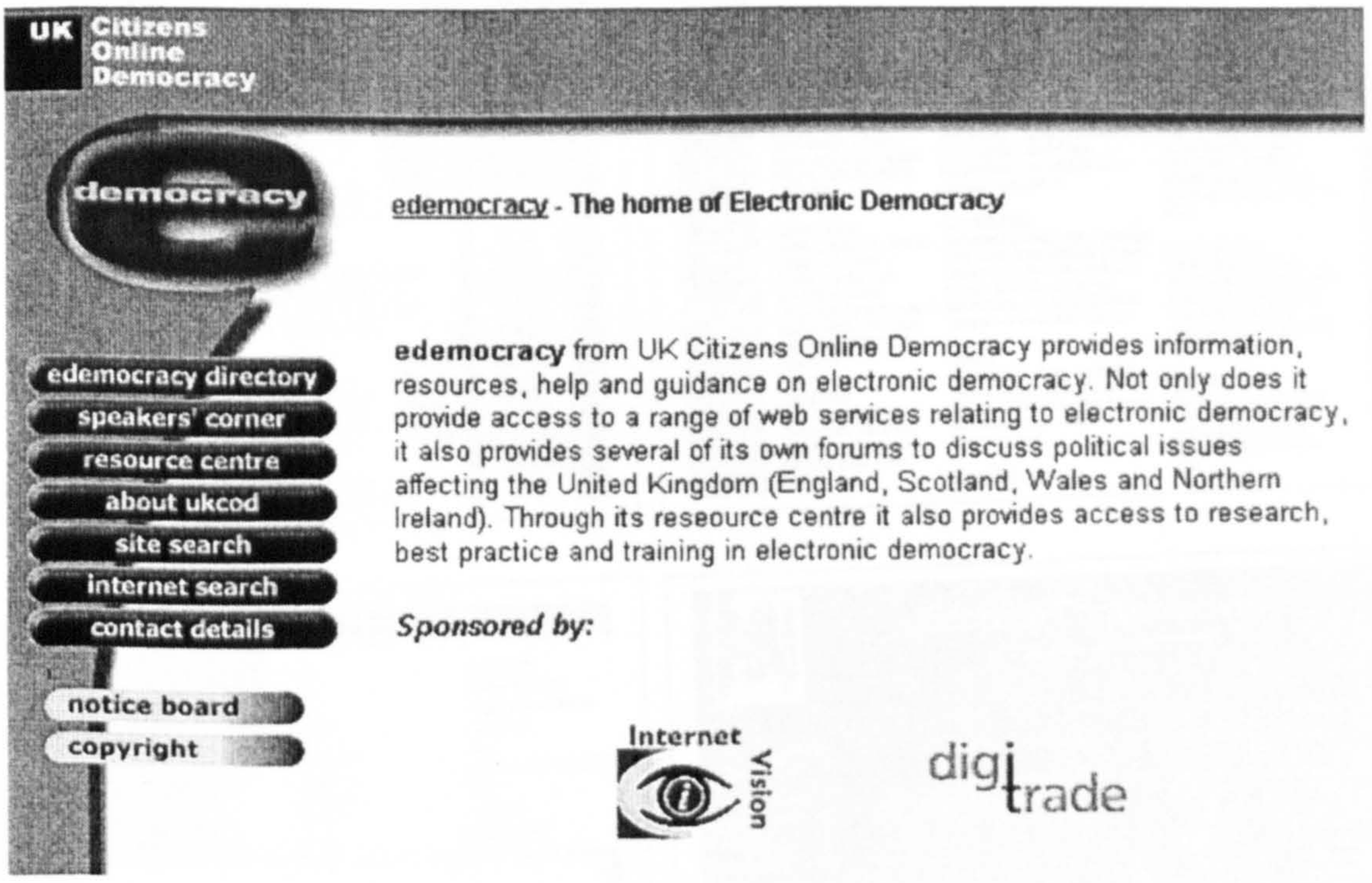
2.2.7 Practice of Cyberdemocracy

There are many examples of efforts carried out by governments, political parties and voluntary bodies to promote Cyberdemocracy. Minnesota e-democracy was established in 1994 by a group of volunteers to promote participation in democracy through the use of information networks. The project put most of the candidates for governor and United States Senate online via the world's first election oriented web site at http://www.e-democracy.org. It held the first online debate via email among candidates and it launched the MN-POLITICS email discussion forum (see figure 2.3).

Figure 2.3: Minesota e-Democracy Web site

Another example is United Kingdom Citizen Online Democracy (UKCOD)[3], an independent and non-partisan web site, which established its presence on the Internet well before the United Kingdom national election in the spring of 1997 (see figure 2.4). It hosted a number of topical events on such topics as European monetary union efforts and online delivery of government services, and it held an all-party debate during the election.

Figure 2.4: United Kingdom Citizens Online Democracy (UKCOD)



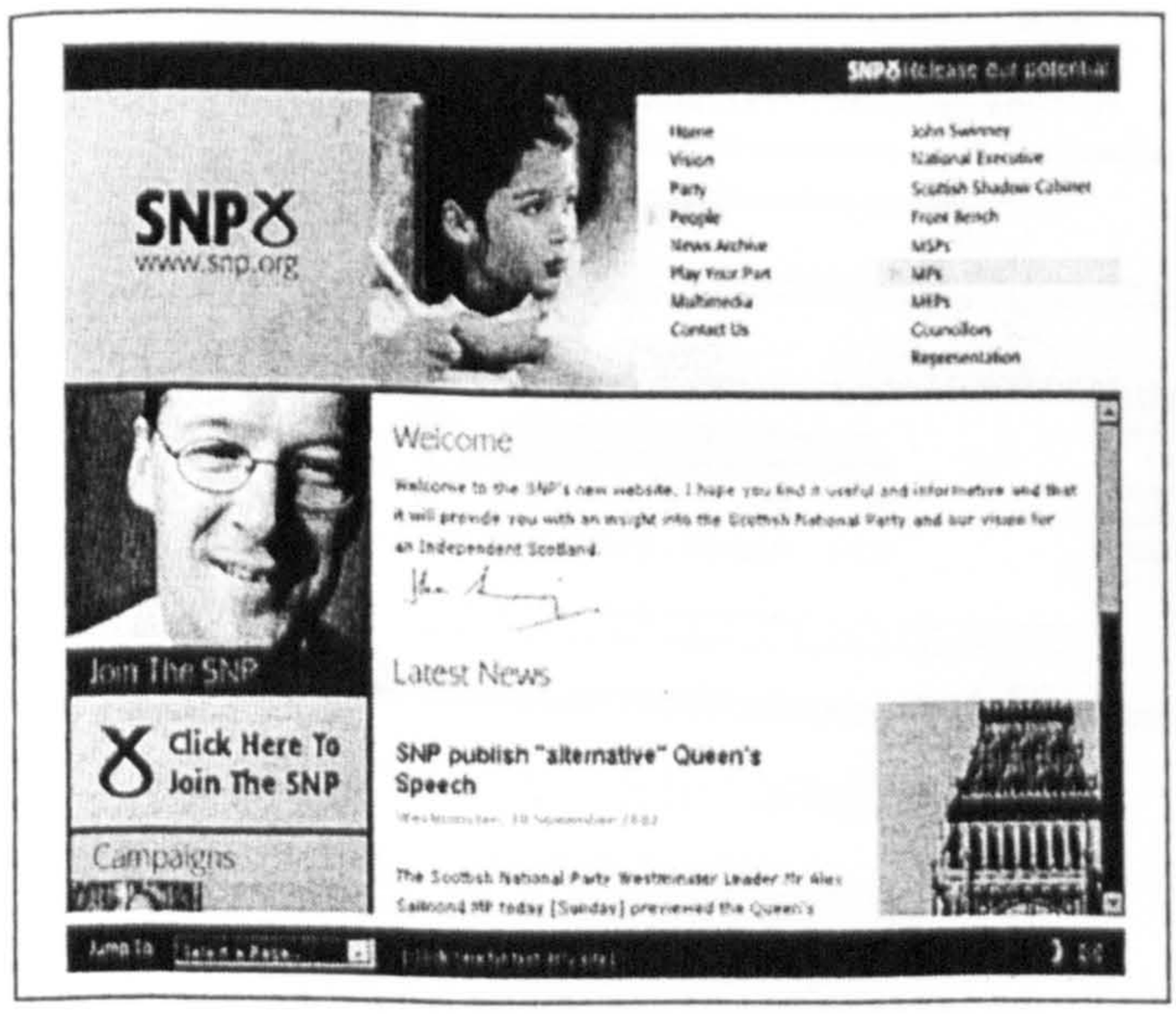
The use of the Internet in the US 2000 presidential campaign by two candidates, Al Gore and Steve Forbes[4] is another good example. Both candidates had used their web sites comprehensively throughout their political campaigns. Both sites were regularly updated on a daily basis prior to the election.

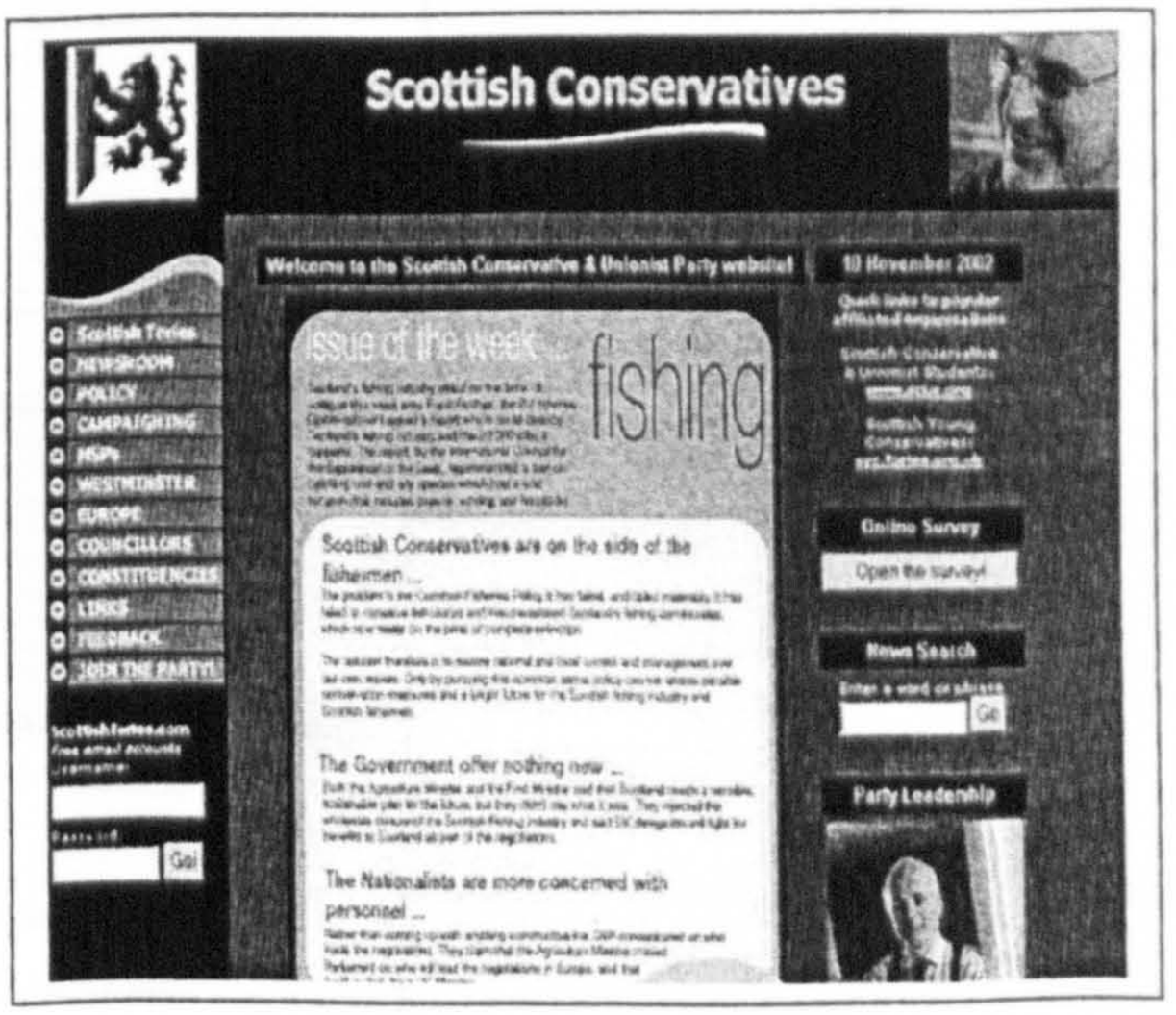
Political parties all over the world have also been using the Internet as a communication medium. In Scotland for example, almost all parties have published their web sites including the Scottish National Party, Scottish Conservative and Unionist party, Scottish Socialist Party and Scottish Liberal

[3] http://www.democracy.org.uk

Democrats (see figure 2.5). While in Malaysia, all three main political parties have developed their own web sites. The ruling party, the National Front (BN) has established its web site at http://www.bn.org.my for a few years. Other main parties such as PAS and DAP also have created their presence on the Internet to pursue their political campaigns (see figure 2.6).

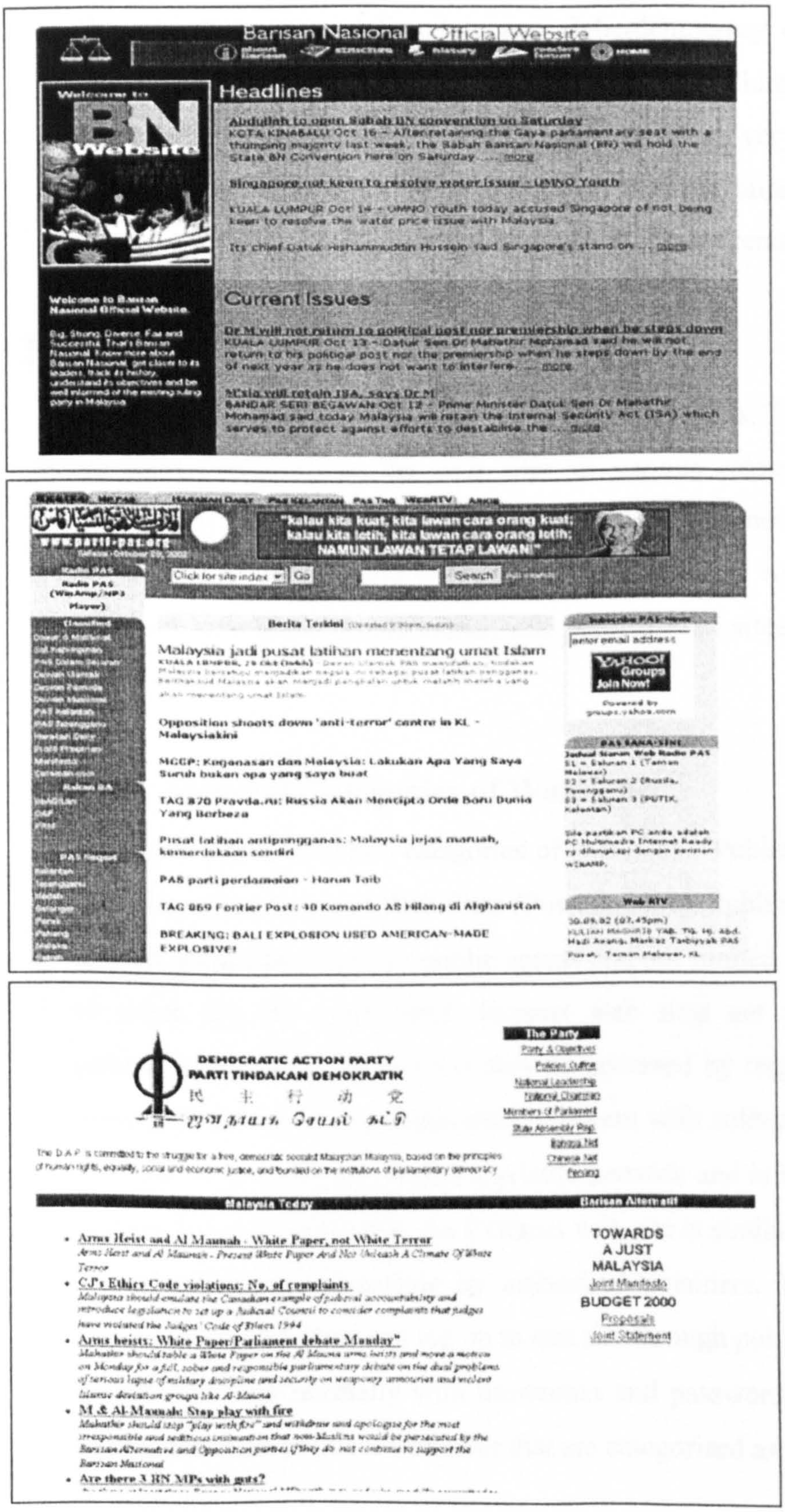
Figure 2.5: Examples of Political Web Sites in Scotland [5]





[5] Scottish National Party (http://www.snp.org.uk/), Scottish Tories (http://www.scottishtories.org.uk/), Socialist Party (http://www.scotsocialistparty.org), Liberal Democrats (http://www.scotlibdems.org.uk/)

Figure 2.6: Examples of political web sites in Malaysia[6]



[6] The National Front Party (http://www.bn.org.my), The Malaysian Pan Islamic Party (http://www.parti-pas.org), The Democratic Action Party (http://www.malaysia.net/dap)

2.2.8 Lack of Research on Cyberdemocracy

The review on current literature and Cyberdemocracy efforts as presented earlier shows that the Internet has become a new medium that could improve democracy. However, despite its potentials, there are very few studies on the effectiveness of Cyberdemocracy. In particular, the impact of the web sites used as a political communication medium on society remains unclear.

2.3 Web Sites: Some Definitions

The number of web sites is growing rapidly over the years. There is abundance of information published on the web sites of various categories, purposes and domain names. This section will explain briefly about general categories of web sites, Interactive versus static web sites, specific types of web sites available on the Internet, web sites domain names, and political web sites defined specifically for this research.

2.3.1 General Categories of Web Sites

In general, there are three categories of web sites - Public Web Sites, Intranet Web Sites, and Extranet Web Sites (Powell, 2000). Public Web Sites are those that are completely open to public access and not limited to a particular group of users. On the other hand, Intranet web sites are privately owned by particular organisations and can only be accessed by target users such as the organisations' members, employees, or others with authorisation. This type of web site is normally run within a private network and is being protected from outside access by firewalls. An Extranet web site is similar to Intranet web site but it is partially accessible by authorised outsiders. This means that the Extranet web site users can log on to this site through public Internet anywhere in the world but normally with usernames and passwords. This research will mainly focus on political web sites that are categorised as public web sites.

2.3.2 Presentation Style: Interactive Vs Static Sites

A web site of any category as mentioned above can be classified as either 'Interactive' or 'Static site'. An interactive web site allows a visitor to interact with its content and with other visitors of the site (Powell, 2000). A good

example would be a site that provides online forms, database searching, and forum discussion. In contrast, a static web site is a site where users cannot directly interact with its content. The information available in this type of sites is normally static. In practice however, a web site has a combination of both interactive and static elements depending on the type of content being presented.

2.3.3 Specific Types of Web Sites

Web sites vary in their goals, target audience and contents. According to Powell and Fleming, there are at least five main types of web sites - Commercial, Entertainment, Informational, Community, and Personal Sites (Powell, 2000; Fleming, 1998).

Commercial web sites are those build primarily for business purposes where the main audience will be potential and current customers of a particular company. Entertainment sites are generally commercial because they mostly sell entertainment products or services but with the main purpose of entertaining visitors. This means that an entertainment site will normally try to ensure that visiting their sites is an enjoyable and entertaining experience. An informational site is different from others because its main purpose is to distribute information. Web Sites belonging to government, educational, political, news, and non-profit organisation are all normally considered informational sites. Community web sites are those that represent central locations for members or a particular community to communicate between each other. Finally, personal web sites are those created by individuals for personal reasons.

According to Shneiderman (1997), one could simply identify different types of web sites by looking at their identities. He lists down five categories of web sites that are *individual, university, corporation, non-profit organisation and government agency.* Each of these web sites has different goals and target users. In addition, Shneiderman also states that the amount of information

provided in web sites also varies according to their identities as shown in the following table:

Table 2.1: Different web site categories

Number of Web Pages	Example genres
1-10	Personal bio, project summary, course outline
5-50	Scientific paper, conference programme
50-500	Book, manual, annual report, city guide, product catalogue
500-50 000	Photo library, technical reports, music databases
5 000-50 000	University guide, newspaper
50 000-500 000	Telephone directories, airline schedule
> 500 000	Congressional digest, journal abstracts
> 5 000 000	Library of congress, NASA archives

Source: Shneiderman (1997), p. 10.

2.3.4 Web Sites Domain Names

Another way to differentiate types of web sites is by their domain names. Domain names are readable Internet addresses assigned for web sites[7]. There are at least ten domain names[8] that reflect their web site providers as follows:

- .com (commercial)
- .gov (government)
- .org (non-profit organisation)
- .edu (education)
- .net (networks)
- .mil (military)
- .biz (business)
- .tv (digital TV)
- .info (informational)
- .<country code> (country code e.g. .uk for United Kingdom, .my for Malaysia, .eu for European countries)

2.3.5 Political Web Sites

This research will focus mainly on political web sites. Political web sites are defined as *the sites used for (either one or more of these) influencing public opinion on social and political issues, disseminating information on social and political development of a particular community, and exchanging ideas between and among political parties, public leaders, politicians and the public*. These web sites are generally divided into at least five categories –

[7] http://www.webopedia.com
[8] http://www.1dns.com

political parties, non-profit organisations, government agencies, pressure groups, and individuals.

Based on the earlier definitions, political web sites are normally *public web sites* that can be accessed by the general public of a particular country. They can also be considered *informational web sites* as most of them are providing information on social and political issues. This type of web sites can also be *interactive or static, or both* depending on the content they provide. In certain cases, they can also be considered *community web sites* as some features can only be accessed by party members or subscribers (e.g. online discussion). In addition, some personal web sites can also be classified as political web sites as they provide information about politics and public issues.

Another way to differentiate between political web sites with other types of web sites is by looking at their domain names. The normal domain names used mostly by political sites are '.org', '.net', or '.gov', for example the web site address of United Kingdom Citizen Online Democracy (UKCOD) at http://www.democracy.**org**.uk. However, some political web sites belonging to individuals or non-profit organisations use '.com' because they might rent or use free web space provided by Internet Service Providers, for example the web site address of Al Gore, the US 2000 presidential candidate at http://www.algore2000.com .

The following table provides a summary that defines political web sites in this research in the context of their categories, presentation style, specific types, and domain names.

Table 2.2: General definition of web sites in terms of category, presentation style, specific types, and domain names.

Category	Presentation style	Specific type	Domain names
Public*	Static*	Commercial	.com
Intranet	Interactive*	Educational	.gov*
Extranet		Entertainment	.org*
		Community*	.info*
		Informational*	.net*
		Personal*	.edu
			etc.
Note: * = is generally associated with political web sites			

The concept of democracy and Cyberdemocracy has been discussed in detail in section 2.2. Whereby this section (2.3) has provided the definition of political web sites in the context of this research. The next section will explore the concept of usability, which is the focus of this research.

2.4 Web Site Usability

Political web sites play a very important role in any Cyberdemocracy initiatives. If political web sites in a particular community are useful and effective, public participation in politics could be improved. However, the success and effectiveness of any web site depends on many factors including usability, which is the major focus of this research. This section will explain in detail the definition and concept of usability, usability models, and factors affecting web usability.

2.4.1 Definition of Usability

Usability is a very broad concept in system design. However, the word 'usability' suggests that it be related to *how convenient, usable, and practicable* a system is for a user. A system here refers to any type of computer applications including a web site. According to Webster dictionary (1999), usability originates from the word 'usable' which means 'capable of being used' or 'convenient and practicable for use'

The Institute of Electrical and Electronics Engineers (IEEE, 1990) defines usability as *the ease with which a user can learn to operate, prepare inputs*

for, and interpret outputs of a system or components. In agreement with that definition, Marcus (1999) states that usability can be defined in terms of *how easy or efficient a product is for a user to recognise, learn, remember, use, and enjoy.*

This research will deal with web usability, a concept that relates to not only web sites' ease-of-use, but also deals with the question of whether web site users can achieve what they are looking for. The concept of web usability will be explained further in the next section.

2.4.2 Usability models

Apart from its' broad concept, usability is also defined differently by different Human Computer Interaction (HCI) scholars. Because of this, approaches to measuring usability also differ between each other. This section attempts to highlight the differences and similarities between four well known approaches to usability as a measurement developed by Shakel(1991), Nielsen(1993), Lu & Yeung (1998), and ISO 9241-11(1998).

Shakel(1991), Nielsen(1993), and Lu & Yeung (1998) define usability as an attribute to a product or system acceptance. Therefore, their model of usability is explained in terms of its relationship with the concept of acceptability of a product or system. According to Shakel, a customer or user would compare the properties of a product or system to the sacrifices needed to acquire or use it. Four properties are proposed in this case - *utility, usability, likeability and costs* defined as follows:

- *Utility* refers to the match between users' needs and functions of a product;
- *Usability* refers to users' ability to utilise the functions provided;
- *Likeability* refers to users' affective evaluations, and;
- *Costs* relate to both financial and social consequences.

In view of this, Shakel defines a product or system's acceptance as a function of perceived utility, usability, likeability and costs. In this model, usability is

seen as a property of a system that is not constant since it depends on the target users, their training and support, tasks and environment. Hence, usability of a system or equipment is ...

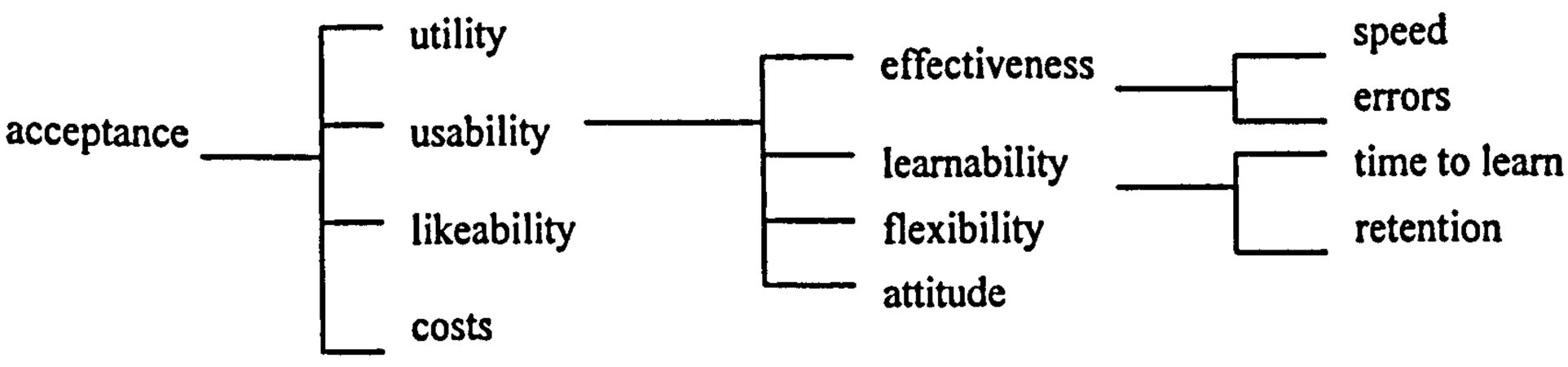
> ...*the capability in human functional terms to be used easily by the specified range of users, given specified training and supports, to fulfil specified range of tasks, within specified range of environmental scenarios* (Shakel, 1991, p 24).

To avoid ambiguousness in this definition, Shakel proposes a set of four operational criteria of usability as follows:

- *Effectiveness*, refers to results of interaction with a system in terms of speed and errors;
- *Learnability*, relates to users' ability to learn a system;
- *Flexibility*, relates to users' ability to adapt to tasks and environments of a system, and;
- *Attitude* refers to users' acceptable level of human costs such as tiredness, discomfort, frustration and personal effort.

Shakel's concept of usability and its relations with other product attributes are summarised in figure 2.7 below;

Figure 2.7: Product acceptance and usability dimensions (Shakel, 1991)



Nielsen(1993) presents his approach to usability in a slightly different concept. He suggests that both usability and utility together form usefulness. Utility is a concept that refers to *whether the functionality of a system can do what is needed*, while usability relates to the question of *how well users can use the functionality*. Usefulness and other perceived product or system attributes like cost, compatibility and reliability will lead to practical acceptability of a

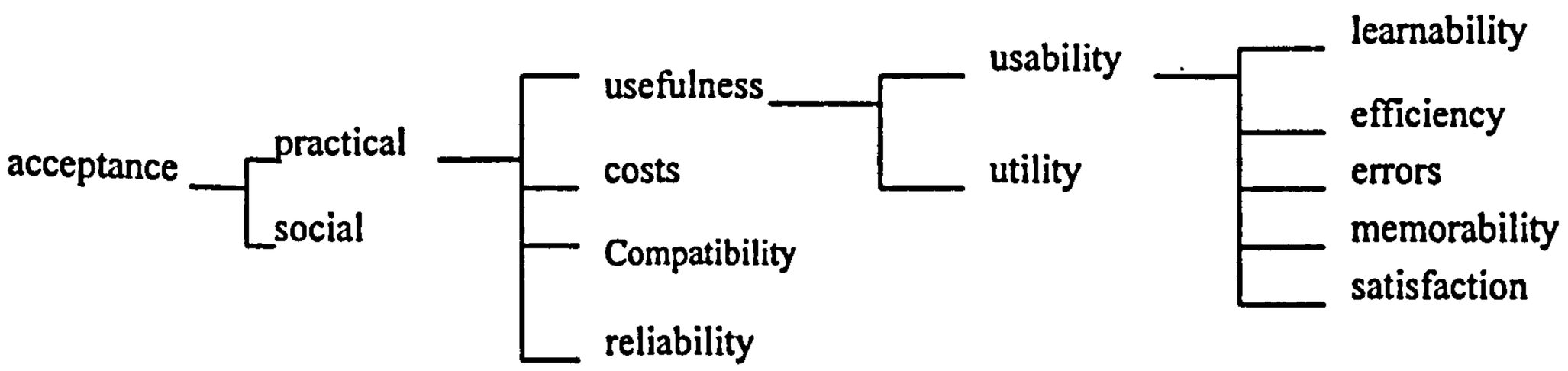
product or system. In order to achieve product or system acceptance in Nielsen's model, social influences should also be considered.

In defining usability, Nielsen also outlines several operational criteria as follows:

- *Learnability* refers to the novices' ability to reach a reasonable level of performance rapidly;
- *Efficiency* refers to expert users' level of performance measured by speed of use;
- *Errors* refers to users' number of errors;
- *Satisfaction* refers to users' subjective assessment of a system concerning how pleasant it is to use, and;
- *Memorability* refers to users' ability to remember how to use a system over time.

A summary of Nielsen's model of system acceptance is presented in figure 2.8 below;

Figure 2.8: Product acceptance and usability dimensions (Nielsen, 1993)



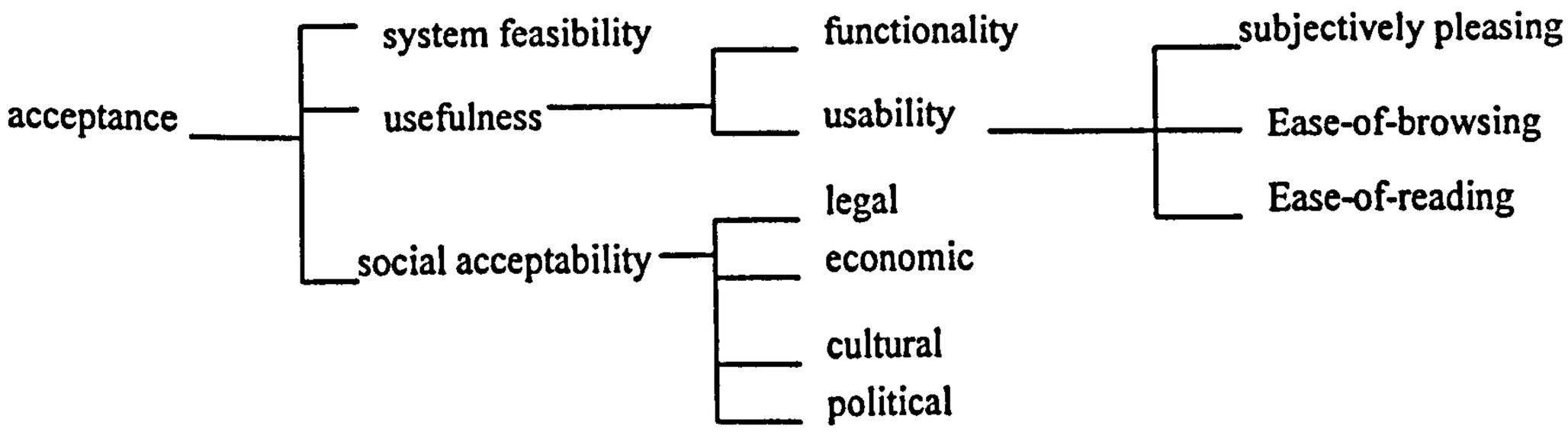
Nielsen's view is supported by Lu and Yeung (1998) who also propose the concept of usefulness as one of the attributes for system acceptability. Their model divides usefulness into two aspects - functionality (which is similar to utility in Nielsen's model) and usability. Lu and Yeung's perception on usability is slightly different compares to the previous one since their model is developed for the web environment. Usability in this model refers to users' ease-of-browsing, ease-of-reading and satisfaction.

Unlike Nielsen, Lu and Yeung suggest three properties of system acceptability: first, system feasibility including economic, technical, operational and organisational feasibility, second, usefulness and third, social acceptability. Their descriptions of social acceptability are clearer than Nielsen's model. A system's success in this model is partly dependent on social acceptability in the context *of legal, political, economic and cultural environment* of a particular society defined as follows:

- *Legal acceptability* means a system produced should be legal in the country of the *intended audience;*
- *Political acceptability* means that an introduction of a system should be supported by the government's policies and legislation;
- E*conomic acceptability* means a product offered on the web (e-commerce) should be targeted to the right audience who can afford to buy, not to the general Internet population, and;
- *Cultural acceptability* means that a system should be accepted to the target audience in terms of their way of life, habits and religious belief.

A summary of this model is presented in figure 2.9 below;

Figure 2.9: Product acceptance and usability dimensions (Lu & Yeung, 1998)

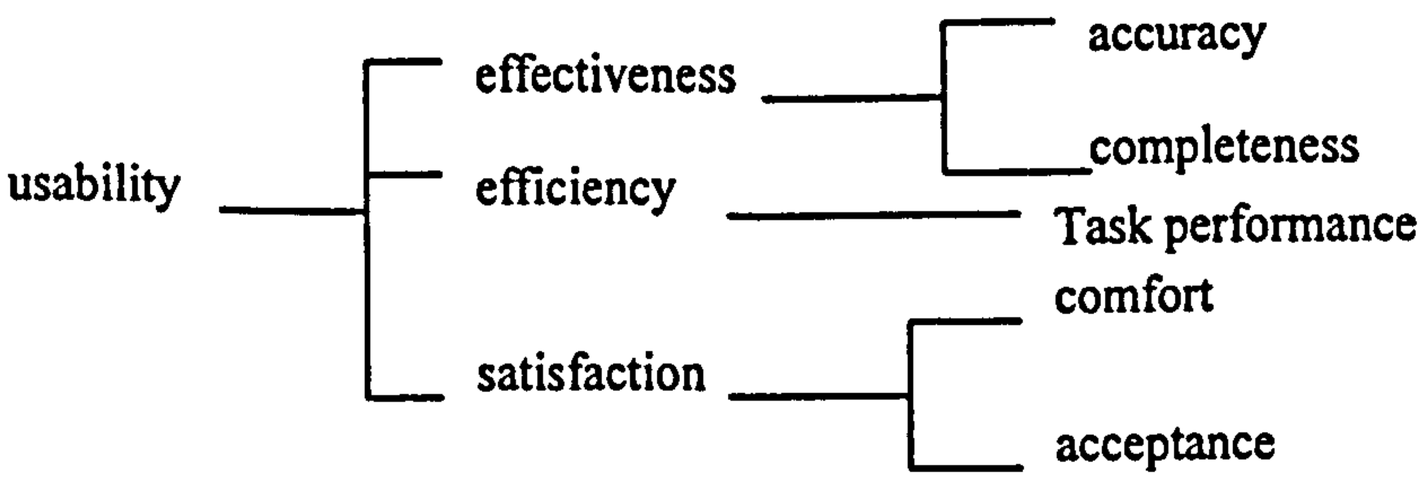


International Standard Organisation (ISO) 9241 part 11 also provides a good definition of usability and its dimension. With no reference made on other aspects or attributes of system acceptance, usability is defined as "*the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use* (ISO 9241-11, 1998)". From this definition, ISO 9241 suggests three aspects of usability as follows:

- *Effectiveness*: the same concept presented by Shakel that refers to the accuracy and completeness of users' tasks while using a system;
- *Efficiency*: the same concept outlined by Nielsen that refers to users' level of performance in completing the tasks, and;
- *Satisfaction*: the same concept as proposed by Nielsen and Lu & Yeung that refers to users' subjective perception of a system in terms of comfort and acceptability.

A summary of ISO9241-11 model of usability is shown in figure 2.10 below:

Figure 2.10: Usability and its dimensions (ISO 9241 part 11, 1998)



While Shakel, Nielsen, and Lu & Yeung regard usability as an attribute to product or system acceptability, ISO 9241 regards usability as a requirement for quality of tasks to achieving users' goals. Nonetheless, the usability dimensions introduced by ISO 9241 that cover the concept of effectiveness, efficiency and satisfaction, do not differ much from the previously discussed models.

The usability models described above highlight the need for researchers to understand the underlying concept of usability as a measurement. Although the approach towards defining the concept of usability is slightly different between each other, all models tend to have agreement on the dimensions of usability that cover aspects of effectiveness, efficiency, learnability, and user satisfaction.

2.4.3 Usability, User-Interface and Content

One important issue with regards to usability definition is the question of whether content coverage of a system should be included as one of the elements of usability. Some people regard usability as an important area of

systems' interface rather than the content, while others see content coverage as one of the aspects of systems' usability. Unfortunately, there is no clear explanation on this in the usability literature.

Nonetheless, most models of usability (Shakel, 1991; Nielsen, 1993; Lu & Yeung, 1998; ISO 9241-11, 1998) include 'user satisfaction' as one of the usability criteria. This element has indirect relationship with the need for content quality of a particular system. User satisfaction is related to users' subjective assessment on a particular system in terms of its ease-of-use as well as its usefulness. This is to say that users will be satisfied if a system is not only easy to be used but also useful in terms of its contents. From this, it can be said that both user interface and content together determine users' level of satisfaction.

Based on these arguments, it can be concluded that usability, one of the main attributes of systems' acceptability, is related to both systems' interface and content quality. Usability can be measured in terms of four different aspects - effectiveness, efficiency, learnability, and user satisfaction. Each of these is defined as follows:

Effectiveness – relates to accuracy and completeness of users' tasks while using a particular web site;
Efficiency – relates to users' level of performance while using a particular web site;
Learnability – relates to users' ability to learn a particular system, and;
User Satisfaction - refers to users' subjective assessment of a particular web site concerning how useful and easy it is to use it.

The proposed scope and elements of usability in this research is summarised in figure 2.11.

Figure 2.11: Proposed scope and elements of usability

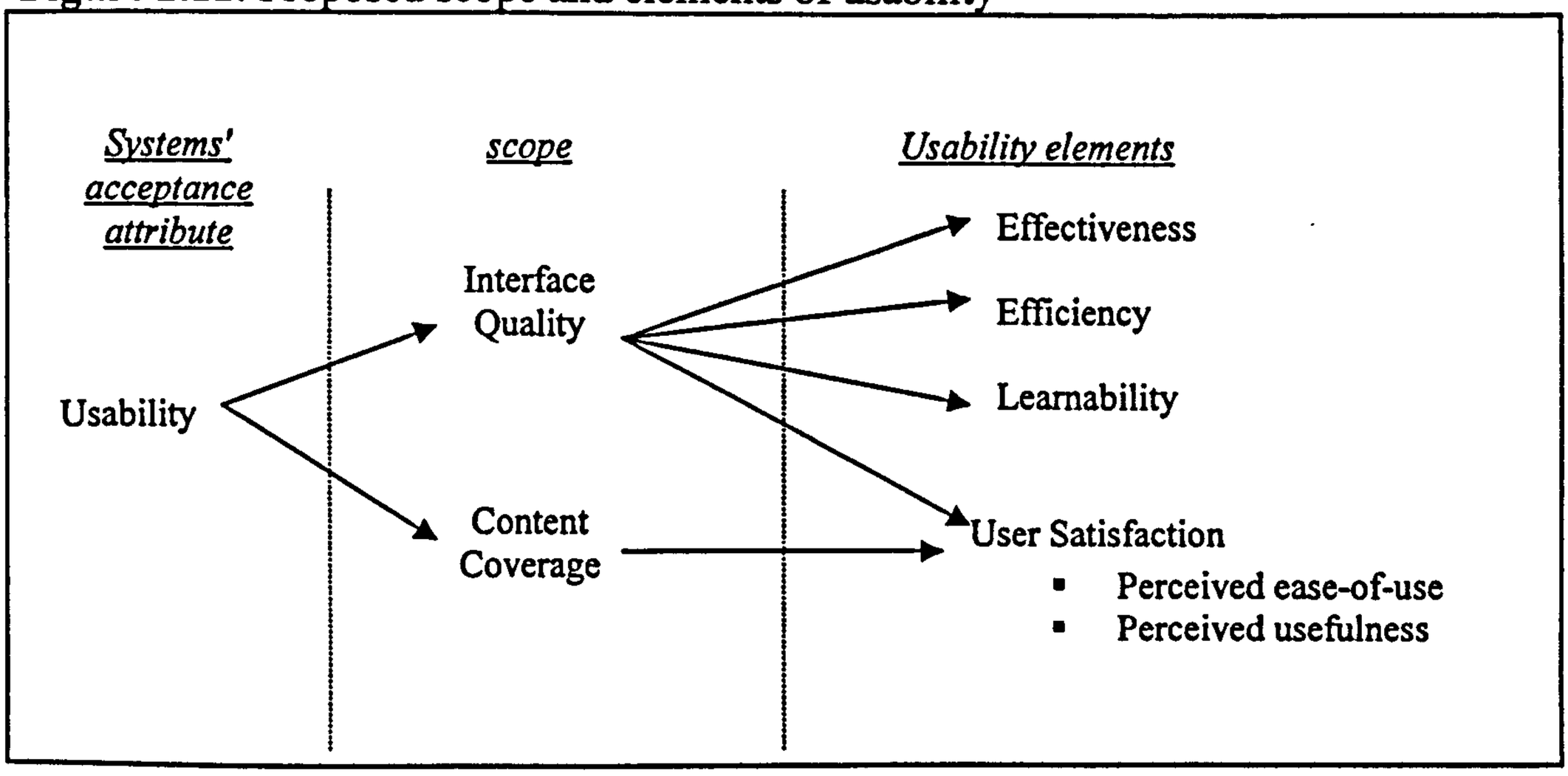


Figure 2.11 divides usability into two categories - interface quality and content coverage. Interface quality relates to four usability elements namely effectiveness, efficiency, learnability, and user satisfaction. Meanwhile, content coverage only relates to user satisfaction. User satisfaction is classified into perceived ease-of-use and perceived usefulness. This means that it concerns with:

- How users perceive the usefulness and ease-of-use of web interface, and;
- How users perceive the usefulness of the web content.

From this argument, it can be said that both interface and content of a particular web site will affect user satisfaction.

2.5 Factors Affecting Web Usability

2.5.1 Introduction

The concept of usability in terms of its definition, models, and scope has been discussed in section 2.4. This section will investigate the general factors that affect web usability by reviewing four major web design guides as follows:

- Web Design: The Complete Reference (Powell, 2000);
- Designing Web Usability: The Practice of Simplicity (Nielsen, 2000);
- IBM Web Design Guidelines (IBM, 2000), and;
- Improving Web Usability and Appeal: Microsoft Web Workshop (Keeker, 1997).

The first two references were selected because both of the authors have a lot of experience in web design and usability areas. Powell is the president and founder of PINT (www.pint.com), an instructor at the Computer Science department, University of California, and a recognised leader in web design and development. He has involved in more than 150 web development projects throughout his career. Meanwhile, Nielsen's popularity in web usability field is widely known. He is considered one of the usability gurus due to his massive experience in many usability projects. Both Powell and Nielsen have been actively participating in conferences, seminars, and workshops, and writing many books in computer related areas. The books used in this review are the most recent ones written by them. The other two references were selected because they are published by two leading companies in computer industries and Internet technology - IBM and Microsoft Corporation.

2.5.2 Web Usability Factors: A review of Four main Guides

According to Powell, there are at least six factors that affect the usability of web sites – site structure, navigation, linking, screen appearance, interactivity and local searching (Powell, 2000).

Powell classifies site structure into two – logical structure and physical structure. Logical structure relates to the way in which documents are linked within a site. While physical structure describes the physical location of files within a site. Powell states that logical structure is more important in the usability aspect because it affects the way users navigate a web site. Hence, designers should choose the correct site structure to make a site usable (Powell, 2000).

Powell also considers navigation as an important factor for web usability. Good navigation helps users find their way within a site. It provides users with answers to questions such as:

Q1: Where am I?

Q2: Where should I go next?

Q3: Where have I been?

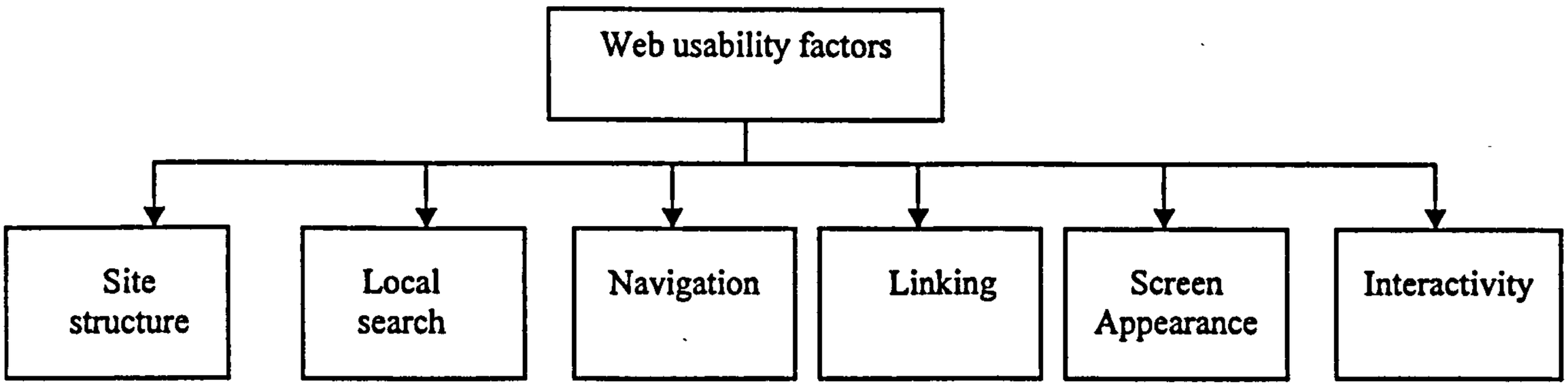
Navigation aids such as precise URL location, page label, and page title are web elements that could provide answer to Q1. On the other hand, Q2 and Q3 relates to the question of whether users are informed of their whereabouts at all time and whether they know how to get back to the previous location. Web elements such as coloured links, history, and home link are examples of navigational aids for Q2 and Q3. Equally important is proper placement of navigational aids on the screen. According to Powell, there is no specific location for navigation elements but usually designers would place them on the top, left or right of pages depending on their creativities. Powell also emphasises the need for consistency in the use of navigational aids to avoid confusion on behalf of users.

Efficient page linking is a key to web site usability. It not only affects site structure, but could also determine whether users accomplish their goals. Page linking is created normally through text links, buttons, icons, and graphics. Screen appearance is another factor that needs to be considered. Powell outlines five major areas that are related to this factor - page layout, text, colours, image and background. Proper page layout concerns with elements such as page size, resolution, page type, header and footer. Besides page layout, designers also need to use text effectively in terms, for example, fonts, alignment, spacing, headings and sub headings, paragraph, and effects. Finally, effective use of colour and images is also said to have an effect on web usability.

Equally important is the interactivity element within a web site such as user control, feedback, and dialogue. Additionally, Powell also believes that providing local search could also be a factor to make a site usable.

Powell's theoretical concept on factors affecting web usability is visualised as follows:

Figure 2.12: Powell's factors of web usability



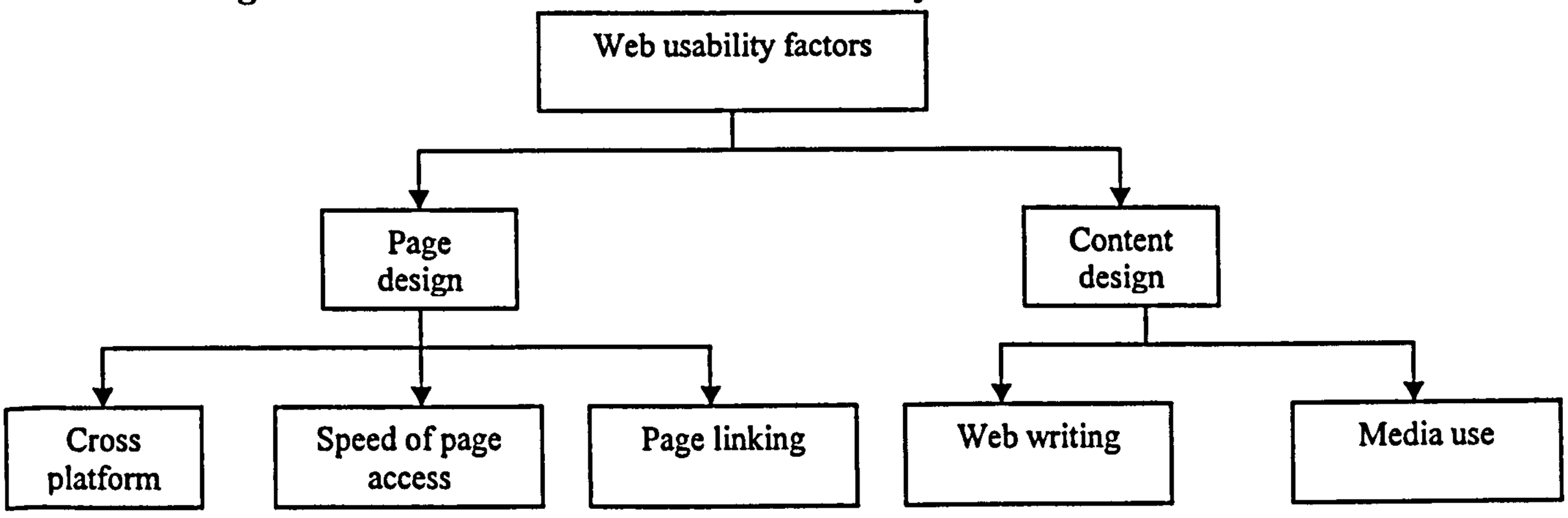
Unlike Powell, Nielsen (2000) describes web usability in terms of page and content design. Nielsen emphasises the need for providing web pages that can be assessed by different screen sizes and resolution. This argument is based on the fact that users get access to the Internet from different devices that have different screen types such as Personal Computers, hand-held computers, hand phones, and digital television. Based on years of researches in usability areas, he also concludes that users prefer web pages that can load quickly (Nielsen, 2000). In another words, designers should design for speed of web pages downloading to improve usability. Nielsen also sees effective use of linking between web pages as a contributory factor towards usability. Proper linking would help users find information within web pages. On the other hand, broken and inaccurate linking might force them to turn away from a web site.

Apart from page design, the usability of one's web site is also determined by proper content design (Nielsen, 2000). Nielsen strongly believes that users prefer to scan for information before reading it. Hence, he recommends using short text, skimming features such as bold, italic and highlighted words, and page chunking. In term of language, he suggests using simple and plain language to accommodate different type of users' educational background. Besides scannability and language, Nielsen also thinks that giving accurate titles for web pages is important to make a web site usable.

Unlike Powell, Nielsen also outlines the importance of proper integration of multimedia elements into web pages. Despite the fact that multimedia elements such as video and animation could enhance presentation, Nielsen says that they should be used properly so that they will not affect usability. Additionally, unnecessary media should be avoided to prevent long

downloading time. Nielsen's view on factors that affect usability is summarised below;

Figure 2.13: Nielsen's factors of web usability



IBM web design guidelines focus on five major factors that determine web usability. Three of them are web structure, navigation and visual layout that have been described by Powell (Powell, 2000). The two other factors are proper use of text and effective use of media, which are related to content design as discussed in detail by Nielsen (Nielsen, 2000).

IBM guidelines suggest designers to use web structure that is suitable for the type of information being presented (IBM, 2000). The information needs to be organised in such a way that it makes sense to the users. Good navigation is also considered very important because it helps users moving around the site easily. Several tips are given to promote good navigation system such as using clear labels for links, providing feedback to users, and the use of ALT tag for images. The guidelines also suggest several ways for designing good visual layout.

Like Nielsen, IBM guidelines also remind designers to consider users' different use of technology to access the Internet. Hence, designers should anticipate users' different screen resolution settings and sizes of their monitors. There are also other elements of visual layout that are not discussed by Powell and Nielsen, for example, the need to avoid long scrolling and horizontal scrolling. One of the most important aspects of visual layout that is not

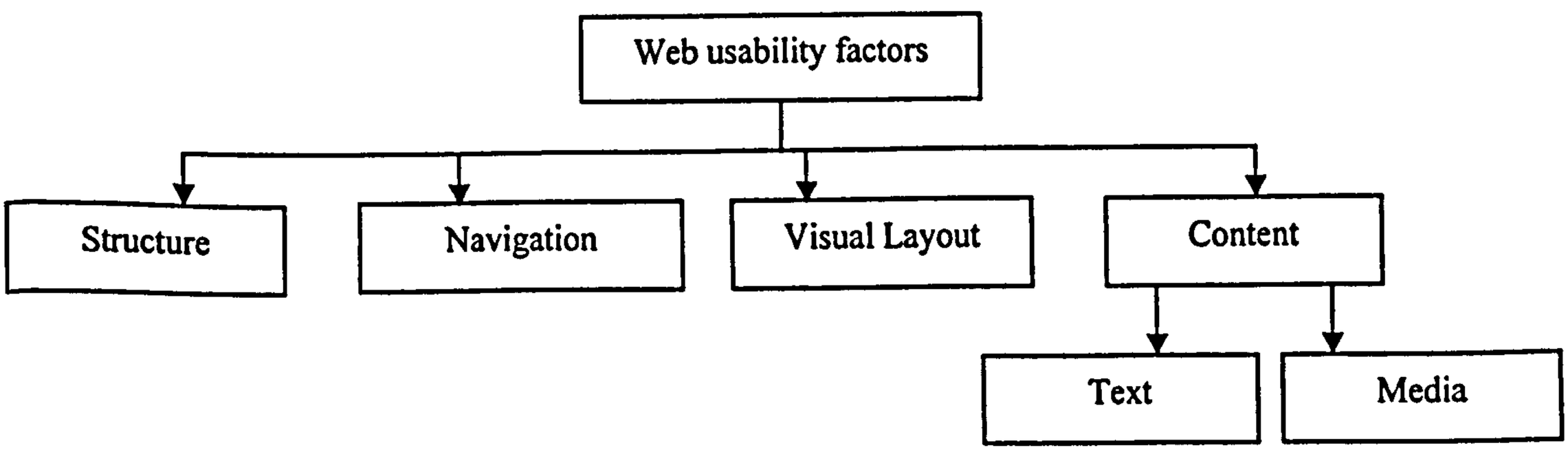
discussed clearly by either Powell or Nielsen is the consistency of visual identity throughout one's web site.

IBM guidelines also present information on how to use text on the web. Most of it is explained by Nielsen (Nielsen, 2000) that focuses on elements that improve scannability and readability. However, there are a few areas that are not mentioned by Nielsen, for instance, the need to design for default browser fonts. Although Nielsen proposes to use media effectively, he does not provide clear guidelines on how it can be implemented. IBM guidelines however outline clearly how media elements should be used to enhance usability. Some examples are as follows:

- Provide user control;
- Inform users of the content and size of media objects;
- Use animations to attract attention, and;
- Use animations to enhance explanation.

IBM web usability guidelines are summarised as the following:

Figure 2.14: IBM's factors of web usability



One important aspect of web usability that has been described by all the three guidelines is accessibility. The word 'accessibility' in this context does not refer to aspects of web pages that provide access specifically to the less privilege users but to different technology used by users to access the Internet. Cross platform design, speed of access, and proper use of text are examples of this.

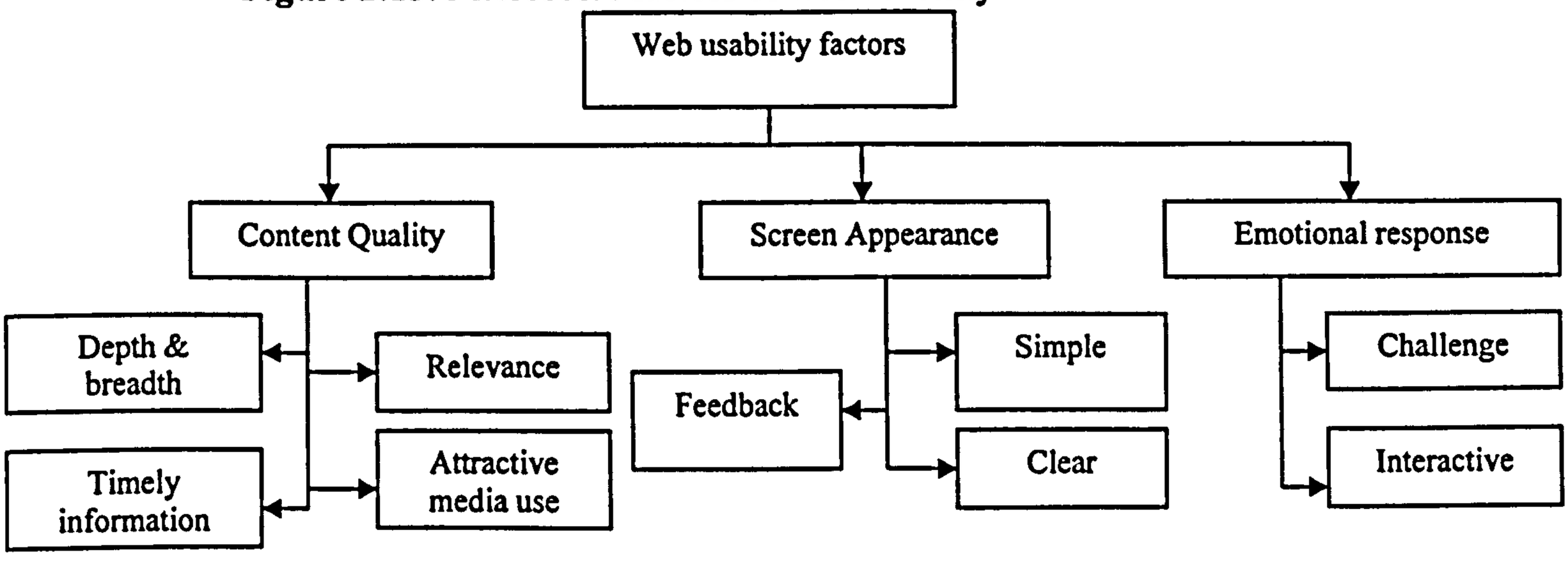
Microsoft also provides web design guidelines to the public by presenting its research on web site usability and appeal. Despite some similarities in terms of the usability area compare to the previous guidelines, there are also some significant differences that are worth mentioning. One of the main focuses of Microsoft guidelines is content quality (Keeker, 1997). Based on its research, it was found that content quality significantly determines the usability of web sites. Contents that are provided in any web site should be relevant and timely. All media elements especially animations should be used effectively and attractively. In addition, designers should ensure that they employ appropriate depth and breadth of web site. By this, it means that links (number of clicks) to particular information from the main page should not be too many and any information presented in a particular page should not be too long.

Unlike the other three guidelines discussed earlier, the Microsoft guidelines claim that designing for emotional response could also contribute towards web usability. This means that a web site should always be exciting and enjoyable whenever they are being visited including the regular visitors. One example of the elements of emotional response is the contents that are challenging. Nonetheless, this factor might not be applicable to all web sites especially those that provide static information.

Besides content quality and emotional response, the guidelines also explain about web structure. Microsoft believes that having simple and clear structure would improve users' navigation within a web site. The word 'structure' used in this document is slightly different with Powell and IBM guidelines. While the former refers 'structure' to the logical structure of HTML documents within a web site, the later refers it to the way information and navigational aids are presented on the screen. In another words, the structure here is more related to the visual appearance of a web site. As a result, most of the checklist items provided under this category are associated with navigational issues such as the use of labels for navigation buttons, positioning of navigation bar, and avoidance of menu scrolling. Microsoft also suggests web developers to provide feedback to users such as page titles, download warnings and reminders to avoid uncertainty on behalf of the users.

The summary of the Microsoft web usability guidelines is shown below:

Figure 2.15: Microsoft's factors of web usability



Based on the analysis of the four guides, it can be concluded that, there are at least seven general factors of web usability which, for the purpose of this research, are called the SCANMIC factors (Hassan & Li, 2001). Each of these is described below:

Screen Layout or Appearance

Web sites should be structured and designed in such a way that users will understand how to use them. In addition, web design should also help users find information easily and effectively.

Consistency

Consistency in design is vital in determining users' familiarity with a web site in terms of for example, navigation icons, colouring scheme, and page structure.

Accessibility

Having good design and useful content are inadequate without considering accessibility factors. This means that designers should take into consideration of whether their web sites are accessible to all target users who use different technology to access the Internet.

Navigation

Good navigation will help users find information easily and quickly especially for large web sites that have hundreds of web page linkages.

Media Use

The use of multimedia elements could enhance information presentation if used properly and effectively.

Interactivity

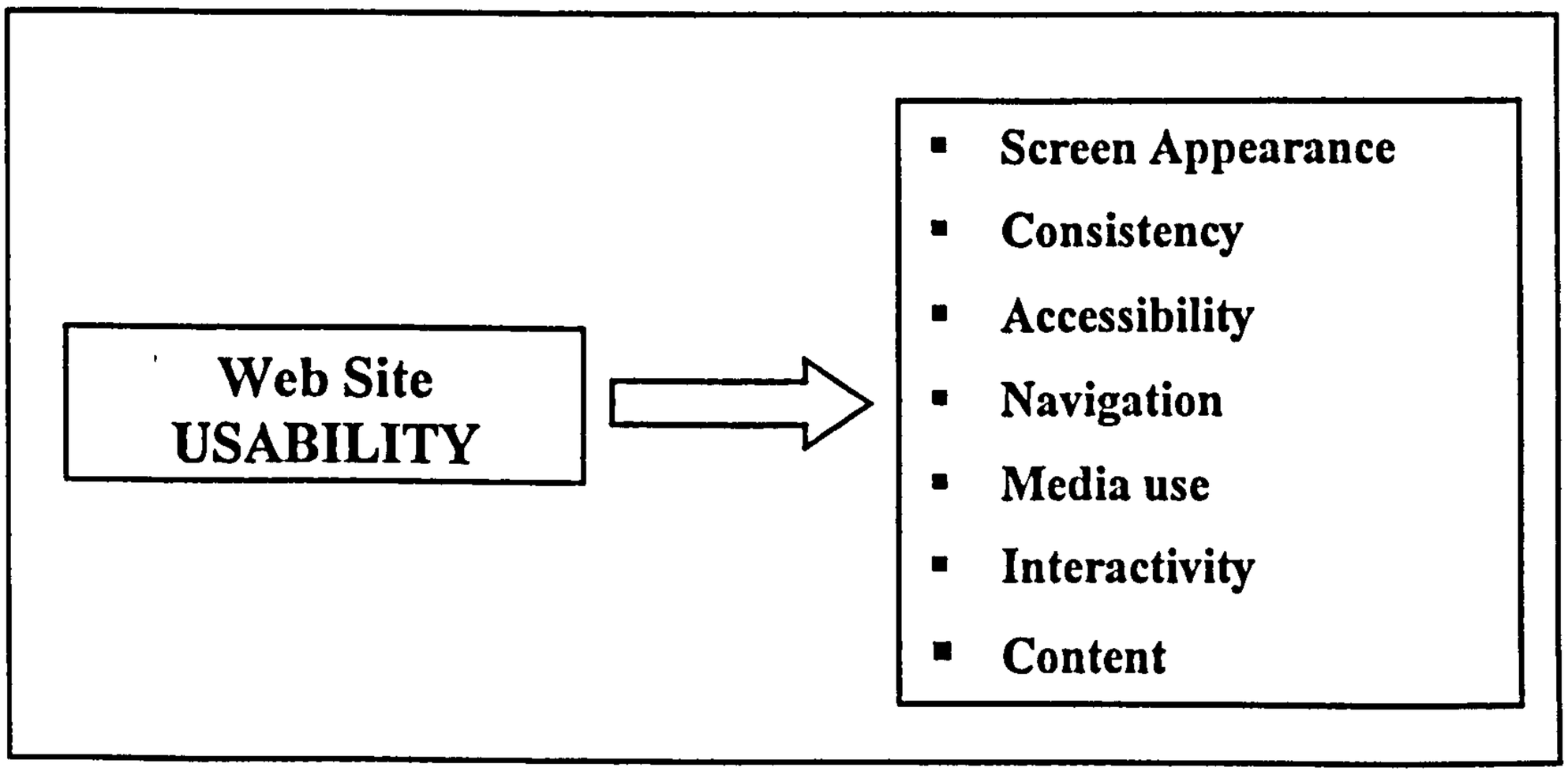
Visitors should be provided with interactivity elements of web sites such as giving response, feedback, and filling up online forms.

Content

Content is normally the main reason why the Internet users are visiting web sites. Hence, content provided in web sites should be useful, relevant, and up to date.

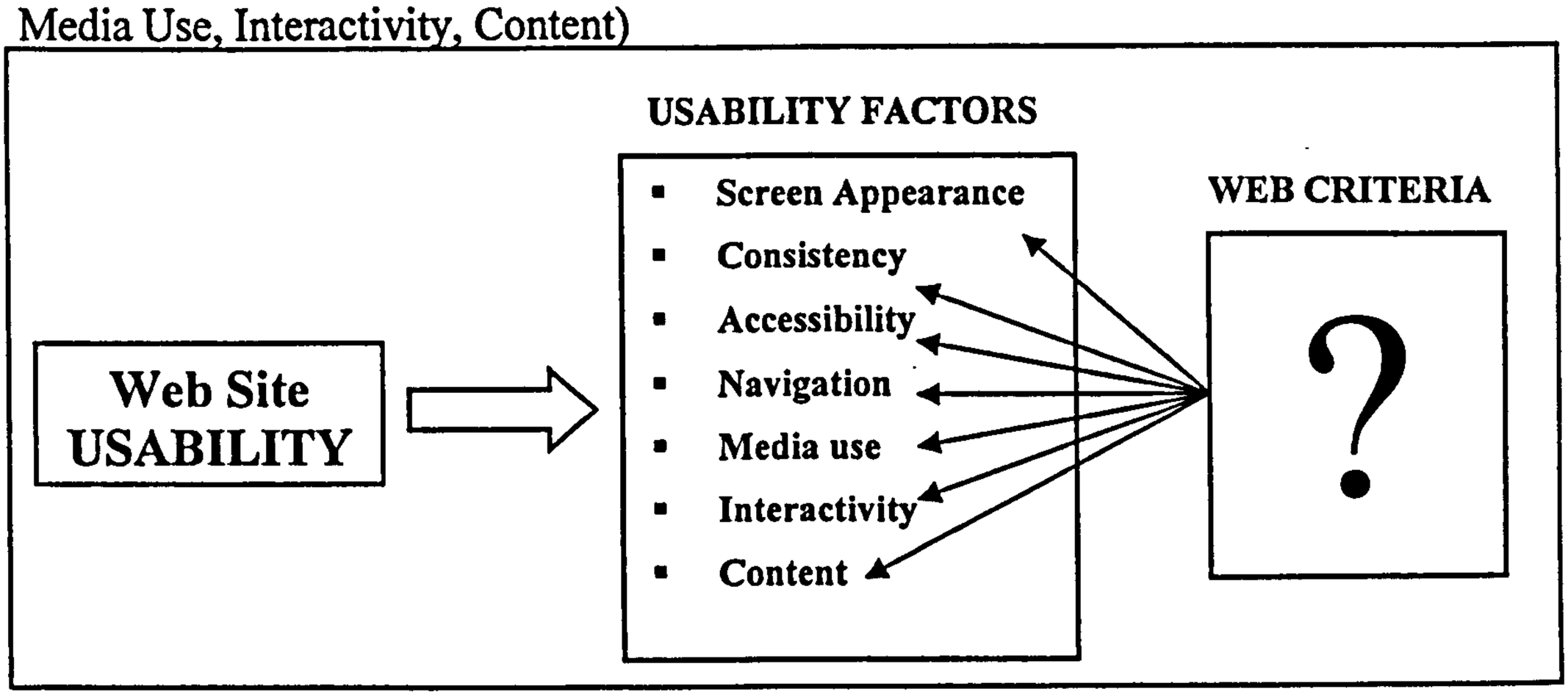
These factors are explained graphically in figure 2.16.

Figure 2.16: Seven factors that determine the usability of web sites



The review of the web design guides has resulted in the identification of factors affecting web usability. However, finding factors alone is not sufficient as these factors are very broad and subjective. Further analysis is needed to explain how these factors will affect web usability. One of the studies that can be carried out is to identify web criteria for each SCANMIC factor that could affect web usability (see figure 2.17), which is one of the objectives of this research.

Figure 2.17: The need for a study on criteria affecting web usability in 7 different areas (Screen Appearance, Consistency, Accessibility, Navigation, Media Use, Interactivity, Content)



The concept of web usability and factors affecting it has been discussed in section 2.4 and 2.5 respectively. The next section (section 2.6) will be a review on some studies related to web usability.

2.6 Web Usability Studies

Effective design of web page could attract surfers to visit a site more than once. Considering this, designers must take into consideration users' expectations and needs before developing web sites. And once web sites have been published, they should be evaluated from time to time for its usability and usefulness. Various efforts are made to study aspects of web design that are usable and effective for users. Most of these studies are based on usability testing approach where a sample from potential users are tested, observed, and interviewed (or requested to answer user satisfaction questionnaire) in a controlled environment such as a laboratory (Booth, 1991). The results from these studies would then be transformed into web design guides, journal articles, or even chapters in textbooks. Some examples are studies carried out by Nielsen (1997c), Zimmerman et al. (1998), Bernard (1997), Spain (1999), Groff et al. (1999), Shenkman and Jonsson (2000), and Wise et al. (2000), which will be reviewed in this section.

Nielsen (1997c), carries out a usability study in 1994 on five commercial web sites - Hewlett Packard, IBM, Microsoft, Sun Microsystems, and Time Warner.

In this study, he selects three participants, a MIS director, a programmer and a systems administrator as test users. These users are observed while they are browsing the web pages. After the testing, he concludes that users have low tolerance for anything in a web page that *does not work, is too complicated or they do not like*. The main strength of this study is that it highlights the need for web designers to incorporate users' expectations into the design process. However, the study suffers some limitations, some of which are listed as follows:

- The number of participants is too small that might affect the reliability of the result, and;
- The test users do not represent the potential users in general as all of them are people that work in Information Technology area.

Bernard (1997) investigates the issue of navigation on the Web by specifically focusing on the usefulness of sitemaps within medium and large web sites. Sitemaps are normally used to assist users in understanding the structural representation of web sites, which would help them find information easily. Two web sites with similar size and organisation are used in the user testing. Users are instructed to use both homepage (main page) and sitemap in looking for information within the two web sites. The result from this study shows that users take fewer steps in locating information by using sitemaps than homepages. This indicates that sitemaps are indeed beneficial in reducing lostness and improving navigation for medium and large web sites. The main limitation of this study would be the fact that only two web sites of similar size and organisation are used. Results might be different if more web sites are tested particularly web sites of different sizes and structures.

Zimmerman et al. (1998) conduct a usability testing to compare the usability of Gopher and WWW prototypes for Colorado State University. Two groups of students are tested on each of the site. This study reveals that participants want *information to be chunked into smaller nodes* to preclude their scrolling through the text. Participants also *suggest that disorientation can be minimised by keeping the information brief, matching headings to menu items, and providing recognisable homepage*. In addition, the participants believe that information

should be organised hierarchically by frequency of information used. Despite the useful findings, the main weakness of this study would be on the sample used. The participants are selected only from the student population although the University's web site is also designed for other groups such as university staff and visitors.

The use of online forms has become a norm in today's web sites. Online forms can be used in several different ways and for several different reasons. Companies might use it to get information about customers' background and order details, universities might use it for online admission application and government agencies might use it for complaints and feedback. Usability study by Zimmerman et al. (1998) on Colorado State University Graduate School on-line application prototype shows that *proper design of online forms* is important for its usability. They find that users whose mother tongue are English and are familiar with the university terminology can easily fill in the prototype form within a short period of time. Whereas those international students who are unfamiliar with the university terminology find it hard to complete the form because of misunderstanding, fear of making mistakes and insufficient blank spaces. This finding is very useful in assisting web design for international audience. However, this study suffers some limitations, for example:

- There is no consideration on the level of English competency among the foreign students. Results might be different if the tested students are all highly competent, and;
- Performance in filling up the online forms does not only depend on language factors, but also on others including the Internet usage experience, and familiarity with the Internet environment.

There is also a study on a proper way of wrapping links within web pages. Spain (1999) carries out a usability study to compare the effectiveness of three different presentations of wrapped links - bullets at each link, spaces between each link, and no spaces between links. Participants are given tasks to find specific information by using the three types of links. Two different data are collected - accuracy and user preference. The results show that the accuracy rates for the three conditions are 100 percent for bullets, 89 percent for spaces

and 69 percent for no spaces. While all participants prefer either bullets or spaces and none prefer no space condition. This study has some limitations including:

- Other types of wrapped links are not tested, for example, links that use different colours, and;
- Sizes of fonts and spaces between links are not considered.

Another interesting research explores how the elderly use the Web (Groff et al., 1999). This study is motivated by the rising number of computer users among the persons over 65. It also attempts to highlight the need for designers to consider the elderly in the design process of web pages. A group of elderly persons (68-87 years) are tested and compared to a group of college students (19-27 years). The result indicates that the elderly are slower than the students. Additionally, they make fewer screen inputs, travel to fewer pages and less likely to return to previously visited pages. However, the elderly are more accurate than the young are, mainly because they tend to carefully read the text on web page before continuing with the tasks provided. The main criticism to this study would be:

- there is no consideration on the level of Internet experience between the participants of both age groups, which would greatly affect the finding;
- differences in biographical background among participants are ignored such as gender, and;
- only two web sites are used during the testing.

Schenkman and Jonsson (2000) investigate the Internet users' aesthetics and preferences of web pages. Using 13 web pages from 13 different web sites, they conducted the usability testing on 18 users in a computer laboratory. The results show that 'beauty' is one of the most important factors that affect users' preferences. The finding indicates that there is a need for designers to balance up the beauty and content factors in web site development projects. Nonetheless, the study suffers some limitations particularly due to a small number of participants, who are all psychology students with the mean age of 30.

Another example is the usability study on Embry-Riddle Aeronautical University's (ERAU) web site (Wise et al., 2000). Seven students were involved in this study where they were asked to complete some tasks (finding specific information), think-aloud while browsing the site (specifying general usability problems), and complete a questionnaire (rating their general perception towards the site). The results show that ERAU's web site is generally usable where navigation is considered very well designed. Nonetheless, the organisation of the site needs some enhancement. Using target audience as samples in usability testing as practised in this study is good for web evaluation. However, the number of participants, like some other studies (e.g. Nielsen, 1997c; Schenkman & Jonsson, 2000), is too small which might affect the value and accuracy of the result.

The web usability studies presented earlier indicate that usability is one of the most important factors in determining the success of web sites. In addition, they also show that usability is a very broad concept covering many aspects of web sites including appearance (e.g. Nielsen, 1997c; Schenkman, 2000), content (e.g. Abels et al., 1999, Schenkman, 2000), structure (e.g. Abels et al., 1999; Zimmerman, 1998; Smith et al., 1997), and navigation (e.g. Zimmerman et al., 1998; Bernard, 1997; Spain, 1999).

Most importantly, the studies reveal that web usability is closely related to expectations and needs of web users (e.g. Nielsen, 1997c; Abels et al., 1999; Zimmerman et al., 1998; Groff et al., 1999; Schenkman & Jonsson, 2000). This shows that usability should be viewed mainly from the perspective of the users, not designers or experts. Another point that can be raised is that although most of the studies focus on generic criteria of web usability, they are using only either commercial or educational web sites as empirical base. Very few studies give attention to political or governmental web sites, which will be the focus of this research.

All the studies presented earlier are based on the usability testing approach. Despite its popularity among large corporations and university researchers, using this approach would be very costly. The main reasons for these are:

- It needs a proper environment for the testing such as a laboratory with adequate equipment such as computers, servers, video cameras, and audio system;
- It needs involvement as many as possible from the target audience, and;
- It needs experience researchers to conduct the tests.

Thus, there is a need for alternative methods that are economical and practical to be used by all.

Another approach that could be used for measuring web usability is benchmarking, a new approach that has been developed recently. Web sites benchmarking has become popular but most of them are based on automated approach. A good example is a study by Bauer and Scharl (2000) that looked into how the content and structure of publicly accessible web sites can be classified and evaluated by using the automated approach. Several operational criteria were proposed based on three main categories namely Content, Interactivity, and Navigation as shown below.

Table 2.3: Automatically collected classification criteria for web benchmarking (Bauer et al., 2000)

Category	*Criteria*
Content	No. of documents Kbytes downloaded [text only] No. of files No. of images
Interactivity	No. of forms No. of documents w/Java scripts No. of Java applets No. Mail-to Links
Navigation	Frames No. of Internal links No. of external links No. of anchors No. of links to anchors

The strength of this method is that the data from many web sites can be analysed comprehensively. Nonetheless, it has a few weaknesses as follows:

- Only objective criteria can be used since they should be quantitative in nature, for example, the number of web documents within a site, and;
- Statistics and numbers reflecting a particular web site alone might not be adequate to classify web sites and measure their effectiveness and usefulness.

Despite its limitations, the automated approach can still be used as part of the evaluation process. Some examples of automated benchmarking tools currently available are presented in the following table.

Table 2.4: Examples of web site benchmarking tools.

Checking server performance	Evaluating compatibility of different browsers	Evaluating Site Accessibility
EchoEcho (http://www.bookmarklets.com)	Déjà vu (http://www.dejavu.org)	Bobby (http://www.cast.org/bobby)
E-test Suite (http://www.entuity.com)	Anybrowser (http://www.anybrowser.com)	NetMechanic (http//www.netmechanic.com)
Somix (http://www.somix.com)		Dr Watson (http://watson.addy.com)

Using the automated tools alone is not adequate to evaluate and benchmark web sites. There are other aspects of web sites that should also be looked at including usability. Although it would be very difficult, if not impossible, to quantify usability, evaluation can still be carried out through manual benchmarking approach. However, there is still lack of studies that attempt to benchmark the usability of web sites.

Several attempts were made on measuring web sites using the manual benchmarking approach. In his article 'evaluating domestic and international web site strategies', Simeon (1999) describes how benchmarking techniques can be used to compare the Attracting, Informing, Positioning and Delivering (AIPD) strategies of commercial web sites in order to clarify strategic opportunities and advantages. In this study, he used the AIPD approach to compare web site strategies of 68 American banks and 54 Japanese banks. Results show that Japanese banks created more dynamic and content-rich environment than their American counterparts.

Another research was carried out by Misic and Johnson(1999), where four factors of web site effectiveness were used to benchmark the web site of the College of Business (COB) at Northern Illinois University (NIU) against forty

five other business schools. The four factors are functions, navigation, content and contact information. The result of the study shows that all schools score fairly well while the COB's performance is far above average.

There is one research that attempts to measure the effectiveness of political web sites in the United Kingdom. Yates and Perrone (1998) introduce several criteria needed by evaluators in measuring political web sites - accessibility, Interactivity, content, and presentation. Using these criteria, they pursue a study on the use of the Internet by political parties in the UK. They find out that the web sites established by the UK political parties are not usable and effective as they have *lack of navigation tools, site maps, multimedia elements, interactive elements, downloading options and image consistency.* This study, however, has its limitations as follows:

a) Only 4 factors are used. There might be other important factors such as consistency, readability and technology compatibility that are not considered;
b) It only uses a checklist of the objective criteria and none of the subjective criteria are considered, and;
c) It chooses only political parties' web sites as samples. Other political web sites such as those belonging to independent non-profit organisations are not taken into consideration.

Although benchmarking approach has proven its success in many areas of business functions, the framework and applicability of this approach in web site evaluation and monitoring needs further research. Hence, it is the intention of this research to suggest a framework on how web sites could be evaluated by using the benchmarking approach. This will be further explained in the methodology chapter.

2.7 Conclusions

Cyberdemocracy has emerged in many countries particularly those that practise democratic political system. The trend has shown that web sites have become a venue through which government, political parties, pressure groups, Non

Governmental Organisations (NGOs), and the general public can communicate between or among each other. Web sites also allow people at large to retrieve different types of information about politics easily and quickly. More importantly, some web sites provide people with opportunities to participate freely in politics by discussing and debating key social and political issues affecting the nation. These are some of the gist that has been presented in the early part of this chapter.

Despite its potentials, it has been argued that there is still lack of research in the area of Cyberdemocracy, particularly on the use of web sites as a political communication medium. The question of whether the use of web sites can effectively generate more participation in politics remains unclear. One of the most important areas that need research is the usability issue of political web sites, the main focus of this research.

This chapter has presented that usability is a very broad area covering many aspects of web sites and have big impact on the success of any web project. Reviews of selected literature has revealed that there are at least seven main factors that affect web usability - Screen Appearance, Consistency, Accessibility, Navigation, Media Use, Interactivity, and Content (SCANMIC). These findings become a basis for the development of a web usability model to be named the SCANMIC model (will be discussed in chapter 4). The model will further explore each of the SCANMIC factors by identifying:

- the sub categories for each factor, and;
- the web usability criteria which are relevant to each factor.

In addition, the model will also be used in the development of a framework for evaluating web usability.

This chapter has also highlighted that most usability studies only focus on commercial and education web sites. Very few studies have been found on areas related to political web sites. In addition, most methods used in these studies are based on usability testing in laboratories or controlled environment. Not many studies attempt to use benchmarking approach in web evaluation.

In short, this chapter has established the fact that usability is one of the main factors of web success but there is a lack of usability studies that are related to political web sites. In particular, there is no clear guideline on how the usability political web sites can be evaluated. Thus, it is clear that there is an urgent need for a framework for evaluating the usability of political web sites.

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Chapter Three

A Discussion on Usability Evaluation Methods and Research Methodology

3.1 Introduction

The main objectives of this chapter are to describe:

- various methods available for web evaluation, and;
- research stages including the methods used for this research.

It begins with a brief explanation on the concept of evaluation including stages and styles of evaluation. This will be followed by the description of various methods currently available for web evaluation. The second part will be the explanation of the stages involved in this research and the methods used during each stage. The justification on how the stages and methods are related to the

research questions and objectives as outlined in chapter 1 is also presented. Finally, each of the methods used for this research will be discussed in detail.

3.2 What is evaluation?

In any computer system development, evaluation is an essential to ensure that the system meets the desired results. Evaluation should occur throughout the design life cycle and its results are used for design modifications. Although it is almost impossible to perform extensive experimental testing continuously throughout the system design process, other form of analytic and informal evaluation should be used (Dix et al., 1998). Shneiderman says:

> *If feedback is 'the breakfast of champions', then testing is 'the dinner of gods' (Shneiderman, 1998, p.124).*

However, designers and evaluators should not choose an evaluation method arbitrarily for the sake of evaluating. Instead, any method to be used should match the stage and purpose of evaluation.

Basically, there are two stages of evaluation (Dix et al., 1998; Shneiderman, 1988), first, evaluation during design process and second, evaluation after implementation. The first is mostly aimed at identifying costly design mistakes prior to implementation while the later is generally aimed at filtering and refining the design for better usability. The main difference between the two stages of evaluation is that most of the evaluations carried out during the design process do not involve users but designers and usability experts. This research would focus mainly on the second stage of evaluation.

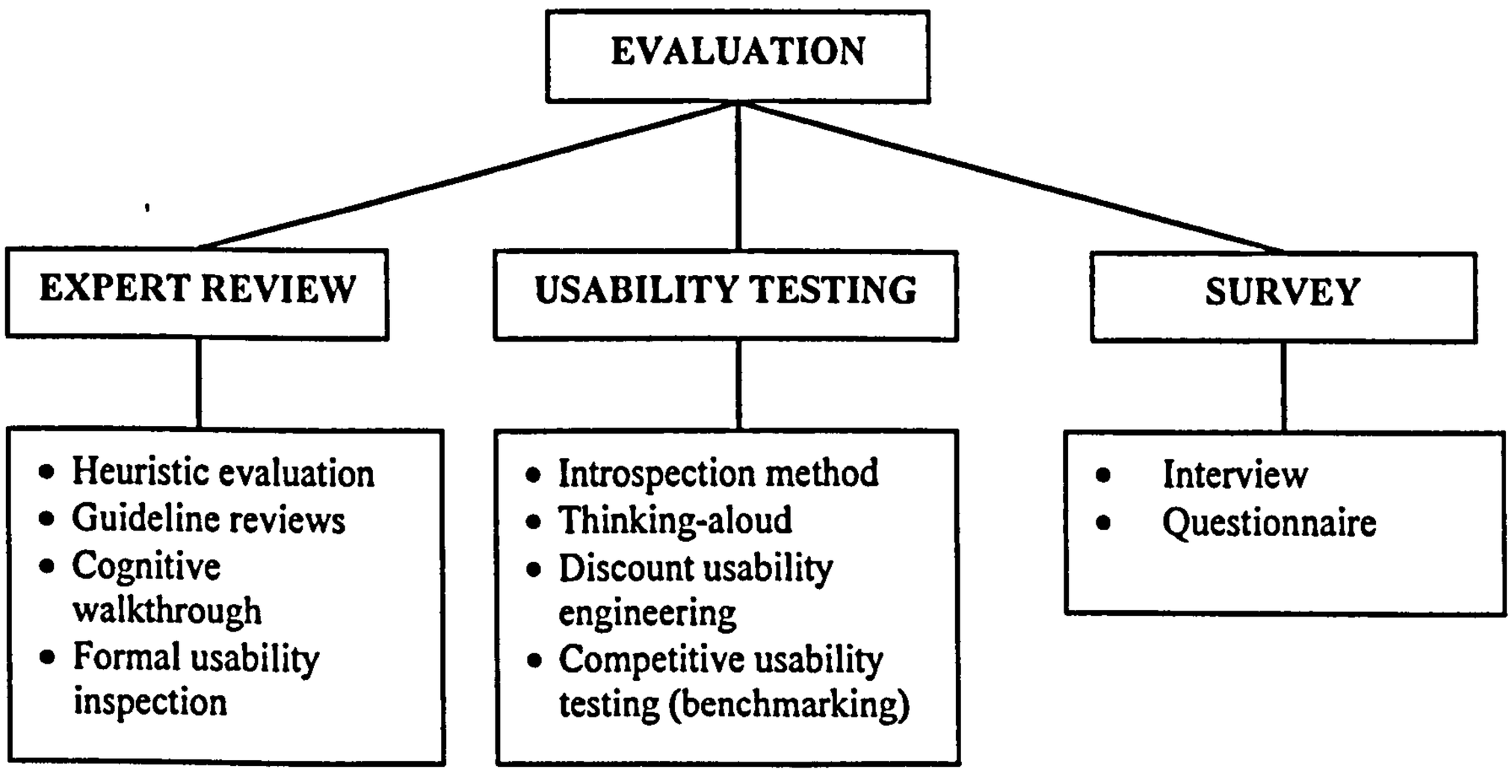
Evaluation can be carried out in laboratories or through field studies. Laboratory works involve users and testers in a controlled environment, whereas field studies attempt to observe users in users' natural environment. A controlled experiment provides empirical evidence to support a particular claim or hypothesis. It can be used to tackle different issues at different levels of user interactions with systems. However, this evaluation style is costly and there is

always fear that users might not react as they should have been in a real environment. Unlike lab testing, field studies are more informal and users are observed in a real work environment. However, the effectiveness of this style depends largely on the experience of evaluators especially in handling the interview and recording the session.

3.3 Usability Evaluation Methods

Many evaluation methods are proposed in the literature to measure system usability, but none of them are exclusive. However, evaluation methods could be divided into three main categories - *expert review, usability testing and survey* (Shneiderman, 1998). There are at least four different methods for expert review - four for usability testing and two for survey (Shneiderman, 1998; Nielsen, 2000; Booth, 1991; Dix et al., 1998), summarised as the following:

Figure 3.1: Usability evaluation methods



Each category of usability evaluation methods presented in figure 3.1 will be described briefly in the next three subsections (3.3.1 to 3.3.3).

3.3.1 Expert Review

All methods used in expert review involve evaluators or testers who possess strong knowledge and experience in the field of User Interface design or Human-Computer Interaction. In the context of this research, the word

'experts' refers to people who have vast experience in web design and development as well as familiar with User Interface design concepts. Some of the methods used in expert review are explained below.

Heuristic evaluation

This method, developed by Jacob Nielsen and Rolf Molich in early 1990s, is a method for structuring the critique of a system using a set of relatively simple and general heuristics (Shneiderman, 1998). The list of heuristics proposed by Nielsen is a result of an analysis of more than 200 usability problems (Instone, 1999). This list could be used by experts in Human Computer Interaction or User Interface design as a guide in evaluating the usability of a system.

According to Instone (1997), there are ten heuristics suggested by Nielsen as the following;

1. Visibility of system status

The system should always keep users informed about what is going on, through appropriate feedback within reasonable time. Additionally, a system's visibility should be able to answer the two most important things that users need to know that are *"Where am I?"* and *"Where can I go next? "*.

2. Match between system and the real world

The system should speak the users' language, with words, phrases and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.

3. User control and freedom

Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue.

4. Consistency and standards

Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow normal conventions and standards in web design. Within one's site, wording in content and buttons should be used consistently.

5. Error prevention

Even better than good error messages is a careful design that prevents a problem from occurring in the first place.

6. Recognition rather than recall

Make objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate. Good labels and descriptive links are also crucial for recognition.

7. Flexibility and efficiency of use

System design should be tailored towards flexible and efficient use for both novice and expert users. For example, the design of a web site allows users to easily bookmark any pages of their interests.

8. Aesthetic and minimalist design

Dialogues should not contain information that is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.

9. Help users recognize, diagnose, and recover from errors

Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.

10. Help and documentation

Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not be too large.

The effectiveness of this method depends largely on an evaluator's familiarity with the heuristics and his or her capability to interpret and apply them in a particular system environment. Furthermore, the method also requires more than one expert to be evaluators so that more usability problems could be identified.

Guideline reviews

In this method, design interface is checked for conformance with certain guideline documents. Evaluators could use organisational or standard design guidelines. This method is worth pursuing since guidelines are normally developed by design experts after years of experiments and empirical studies. The main problem with this method is that most guidelines are too exhaustive with hundreds of items to be looked at. This means that it may take some time for evaluators to study and get familiar with the items before actually evaluating a particular design.

Cognitive walkthrough

This method requires evaluators to simulate users walking through the interface to carry out some tasks. The origin of the cognitive walkthrough approach to evaluation is the code walk-through that is mostly used in software engineering (Dix et al., 1998). The method requires experts to review the sequence of actions of a user while executing some tasks designed by evaluators. The experts would step through each sequence to track down possible usability problems. Generally this method is more suitable for evaluating learnability of a system. Apart from time consuming, this method also requires concentration and full co-operation from experimented users.

Formal usability inspection

As the name implies, this methods is very formal in nature where a group of experts is presented with the completed design of a system in a meeting, chaired by a moderator (Shneiderman, 1998). The group would then discuss its weakness and merits. Results of the discussion would be the suggestion on how to improve the usability of the system design. This method is effective but may take some time to prepare and process results.

3.3.2 Usability testing

Unlike expert reviews that are normally used during design process, usability-testing methods are more suitable for evaluating completed systems or prototypes. Furthermore, most usability testing methods involve users who

would be tested in a laboratory or real working environment (Booth, 1991). Several methods for user testing are summarised below.

Introspection Method

This is a very simple method where a designer tries out the completed system or prototype (Booth, 1991). The technique allows the designer to test the usability and functionality of the system. The designer will then voice out his or her opinion on the performance of the system. As a designer, any major problems with the system will be identified especially the early versions. However, this method has weaknesses in term of its reliability because designers' comments and opinion are completely subjective and also in term of its validity because an introspector is a non-typical user.

Thinking-aloud

The basic idea of this qualitative method is that users are encouraged to think aloud about what they are performing (Dix et al., 1998). Testers would normally provide a set of tasks for users to perform and the users are invited to give comments about the usability problems they come across. While users performing the tasks, testers would observe, take notes and even interrupt the session to clarify certain user reaction. There are several methods used for recording user actions including paper and pen, audio recording, videotaping and computer logging.

Among the advantages of this method are that the users are encouraged to criticise whenever he or she feels like and the tester could seek clarification on points of confusion at the time they occur. However, the evaluator should be very careful not to take over and control the session as it might distract users' concentration. The usefulness of this method also depends on the effective use of recording method and subsequent analysis.

Discount Usability Engineering

Introduced by Jacob Nielsen in 1993, this method is known as a simple and quick approach towards evaluating usability of a system (Instone, 1999). It provides an alternative to using extensive usability trials with end users. The

idea behind this technique is that, instead of using many users in a controlled experiment, only a few experts are employed (3-5 experts) to identify usability problems in a system design. However, these experts are encouraged to collaborate during their evaluation rather than working alone as in expert review methods. The reason for this is that, a group of experts working together at the same time are more effective than working individually at identifying and solving problems.

This technique is still debatable in term of its effectiveness because it moves away from the conventions of performing details trials with end users. Furthermore, experts are not users and thus might overlook the usability problems. Despite its weaknesses, the approach is likely to be used as it is cost effective and simple to apply.

Competitive Usability Testing

This technique is used to compare a completed system or prototype with the previous versions or with products of other companies (Shneiderman, 1998). Although the word 'benchmarking' is not mentioned by Shneiderman, this method is similar to the benchmarking technique used in business. This method is powerful because participants would be able to compare and contrast between the competing designs. However, this technique is time-consuming because users are expected to evaluate more than one system. Therefore, those who choose this method would normally employ a limited number of users for testing. Alternatively, they could employ experts to benchmark a system against its competitors.

3.3.3 Surveys or Query Techniques

The most common methods in surveys are interview and questionnaire. These techniques are employed based on the belief that 'when we need to know how usable a system is...we must ask the users themselves'. These methods are very useful particularly in eliciting users' view of a system as well as gathering issues that are not tackled by designers. In addition, they are economical and easy to administer. However, the results from these methods

are mostly very subjective and might not be accurate; therefore, they should be used as supplementary to other methods.

Interview

In this method, users are interviewed about their experience with systems usage. There are three types of interview technique namely structured, semi-structured and unstructured. Interviews are very effective for high-level evaluation particularly in eliciting information about user preference, impressions and attitudes (Dix et al., 1998). Evaluators can also focus on questions that reveal aspect of designs that are not considered during development process. One main advantage of interviews is that the level of questioning could be varied to suit the context. In addition, the interviewer can concentrate on interesting issues when they arise.

Questionnaires

Asking opinion of users about the usability of a particular system through questionnaire is clearly less flexible than the interview technique due to the fact that questions are fixed by the evaluators in advance. Nonetheless, this method allows evaluators to reach a wider subject group and provide questions that can rigorously be analysed. However, the questionnaires need to be properly designed because the evaluator will not involve in their completion. Proper choice of styles in designing questions could also determine the effectiveness of this method. Evaluators can choose open-ended, scalar, multi-choice or ranked questions depending on the purpose of the query.

Despite the fact that this method is useful for gathering users' perception, attitude and general acceptability of a system design, employing this technique alone is not adequate. One main argument of this technique is that respondents might not tell the truth or in other words, their answers do not reflect their actual behaviours. According to Nielsen (Nielsen, 1999b), self-reported data is extremely weak and three levels removed from the truth listed as follows:

1. *Users tell you what they think you want to hear or what they think is socially preferred answer;*

2. *Users tell you what they remember believing that they did (but memory is highly fallible, especially regarding the specifics of interaction behaviour), and;*
3. *Users can only report what they believe they did; not what they actually did, and people always rationalise their behaviour when thinking about it after the fact; also they don't even notice many of the things that they do.*

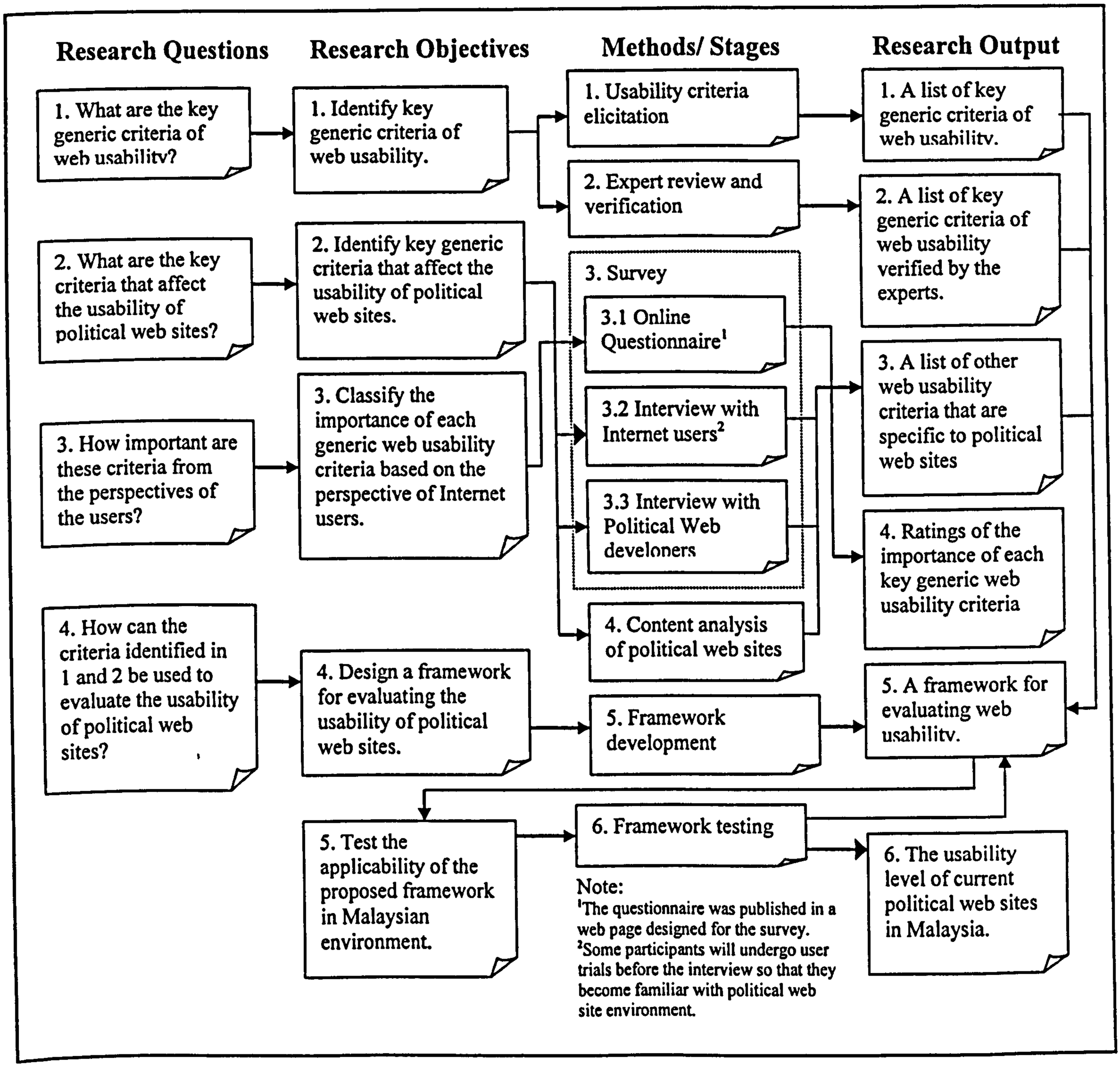
3.3.4 Other Evaluation Methods

Apart from those mentioned above, there are also other methods that are used in web evaluation. The most common one is web server logs analysis. This evaluation is based on the raw measures captured from web servers such as number of page hits, date and time of access, visitors domain (where they are originating), browser types used by visitors, referring links (where visitors come from), and server performance (Buchanan & Lukaszewski, 1997). This method is not very suitable to be used in assessing web usability because it can only rely on raw measures that can be quantified. Other aspects such as screen layout, navigation, and content usefulness could not be measured by using this method.

3.4 Research Methods

Some common methods used in usability evaluation were already described in 3.3. This section will then explain the methods used to achieve the objectives of this research. In general, this research was conducted over five different stages based on the research timeframe and the chosen methods. Figure 3.2 provides a diagram of the methods used, research stages involved, and how they are linked to research questions and objectives. The expected outcome from each method is also included.

Figure 3.2: Research framework



To achieve the first research objective, two methods were utilised - usability criteria elicitation and expert review. The research began with the former method in stage 1, followed by the later in stage 2. Stage 3 was divided into 3 sub-stages (3.1 to 3.3) since all methods used are related to the survey approach. Online questionnaire (3.1) was employed to meet objective 3. Meanwhile, interview with the Internet users (3.2) and interview with political web site developers (3.3) were conducted to achieve research objective 2. Stage 4 was the content analysis of political web sites, an additional method employed to

achieve objective 2. Finally, stage 5 and 6 were framework development and framework testing, designed to meet objective 4 and 5 respectively. Each of these stages is described in the next section.

3.4.1 Choice of Methods and Research Stages

This section will briefly explain each research stage and the methods involved. The details on the research methods will be discussed later in the next section.

Stage 1

The first stage was the usability criteria elicitation. This involves extensive reading and content analysis of current literature on web usability. The main objective was to identify the generic usability criteria that were applicable to all types of web sites.

Stage 2

This was the stage of data collection where the expert review method was employed. Its main purpose was to get verification from the experts on the list of web usability criteria identified in stage 1. The verification was essential because the list was used in the design of the questionnaire survey for the Internet users.

Stage 3

Once all web usability criteria identified in stage 1 had been verified by the experts, a survey was conducted. This survey was based on a combination of both questionnaire and interview with the main objectives of:

- identifying the perception of political web site users' on the importance of generic web usability criteria as identified in stage 1 and 2, and;
- identifying other web usability criteria that specifically affect the usage of political web sites.

To achieve the first objective, an online questionnaire was developed and then published on a web page (refer appendix I). To achieve the second objective, interviews with Internet users and web developers were conducted. Before the

interview, *user trials* were performed on some[1] Internet users that participated in the survey. This means that the participants were given time to browse a number of selected political web sites before participating in the interview. All these methods were briefly described below.

a) Questionnaire

The list of web usability criteria identified in stage 1 and 2 are the generic criteria that are supposedly applicable to all type of web sites. Therefore, the next stage in this research was to use a questionnaire to identify users' perceived importance of each usability criteria pertaining to political web sites.

b) User Trials

Participants in the interview who were not frequent users of political web sites underwent user trials before participating in the interview. The main objective was to ensure that the participants were familiar with political web site environments before participating in the interview.

c) Interview

The interview involved two samples from two different populations - the Internet users and the political web site developers. In general, the main aim of the interview was to reveal general views and opinions from the participants (both web developers and Internet users) on the usability issues of political web sites. The main objective was to identify specific criteria and factors of political web sites that affect usability.

Stage 4

Since the content usefulness also affects the level of usability of a particular web site, this stage was reserved for finding the key elements of contents for political web sites. Content analysis method was used to analyse the content coverage of twenty selected political web sites in Malaysia, Australia, United Kingdom, and United States.

[1] The trials were performed only on participants who were not familiar with political web sites

Stage 5

During this stage, the list of web usability criteria derived from stage 1 (criteria elicitation), that was verified by the experts in stage 2 (expert review), and rated by the Internet users in stage 3.1 was finalised. A list of web usability criteria that are applicable only to political web sites gathered from the interview (stages 3.2. and 3.3) and web content analysis (stage 4) was also finalised.

The list of web usability criteria with their relative importance as well as the content coverage for political web sites were the backbone for the design of a framework for evaluating political web site. Despite many techniques outlined earlier, the framework for evaluating political web sites was developed based on the benchmarking technique. The rationale for this is explained later in this chapter.

Stage 6

This is the final stage where the proposed framework was tested on political web sites in Malaysia.

The following section will discuss in detail about each of the methods used for this research.

3.4.2 Usability Criteria Elicitation (stage 1)

Web design guidelines are developed by experts in Human Computer Interaction (HCI) and User Interface design based on a lot of experimental results and evidence. Although some of the experiments apply to a specific environment, most of them deal with generic issues that are applicable in a variety of situations. Therefore, some usability literatures (web design guides, textbooks, and journal articles) were revised to extract generic usability criteria of web sites. The literature used were those suggested by leading figures in User Interface design and Human-Computer Interaction (HCI), for

example Jacob Nielsen, Keith Instone, and Gary Perlman[2]. In addition, references provided by the British HCI group at their official web site[3] were also referred to. More than 30 web design guides were used in this research, some of which are listed below:

- Web Graphics – elements of web design (Benjamin, 1996).
- Building Usable Web Pages: An HCI Perspective (Comber, 1996).
- Web Typography (Hypermedic.com, 1998).
- Web Design Guidelines, Design In Action, IBM Ease of Use (IBM, 2000).
- Improving Web Site Usability and Appeal (Keeker, 1997).
- Interface design for WWW Web Style Guide, Yale Style Manual (Lynch & Horton, 1999).
- Web Content Accessibility Guidelines 1.0 (MIT et al., 1999).
- Applying Writing guidelines to Web pages (Morkes & Nielsen, 1998).
- Designing Web Usability: The Practice of Simplicity (Nielsen, 1999).
- Creating a Web Presence (Potomac Knowledgeway, 2000).
- Designing Information-abundant Web sites: issues and recommendations (Shneiderman, 1997).
- Designing the user interface: Strategies for effective Human-Computer Interaction (Shneiderman, 1998).
- Web Design, the Complete Reference (Powell, 2000).

All generic criteria highlighted in the selected usability literature were analysed. Each identified criterion was placed under one of the SCANMIC factors based on their suitability and relevancy (refer to figure 2.16). During the analysis, all criteria and elements of usability that were considered too technical were rephrased or in some cases, excluded as the framework to be developed was aimed at both technical and non-technical people. Part of the review on the usability factors was presented in the literature review chapter (refer to 2.5).

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[2] Nielsen, Instone, and Perlman provide a list (with links) of good web design references at their web sites http://www.useit.com, http://usableweb.com, and http://hcibib.org/readings.html respectively.
[3] Http://www.bcs-hci.org.uk

3.4.3 Expert Review and Verification (Stage 2)

The criteria derived from the literature review then underwent the expert review process. The main purpose was to ask the experts to review and verify all the identified criteria. During the review, the experts were allowed to *add, edit or remove (delete)* the criteria where appropriate. The word 'experts', as defined earlier, refers to people who have vast experience in web design and development as well as familiar with User Interface design concepts. The main criteria in choosing the experts was that they should have at least five years experience (Norshuhada, 1999) in ONE of the following;

a) web design and development;
b) online computer system design and development, and;
c) usability studies.

Several names of experts were identified from the HCI reading list (Sears, 1998) and the CHI-WEB mailing list. The identified names were listed in appendix III. The selected experts were invited to participate in this research through electronic mails. A list of the web usability criteria together with cover letters were then sent to those who accepted the invitation (see appendix IV). The response received from them was analysed accordingly.

The main weakness in this method is that it is very difficult to analyse the data provided by the experts. Each expert would have different opinion and perception on certain issues. To minimise this problem, *only the criteria where most experts were in general agreement were taken into consideration.*

An alternative to this method would be the use of the Delphi technique to get a general consensus among the experts. This technique is normally used for obtaining input from a group of experts in a geographically dispersed area (Custer et al., 1999). However, the Delphi technique is not practical in this research because of the following reasons:

a) The Delphi should be carried out in at least three rounds. This means that experts must participate in several rounds before a consensus is achieved. In practice, however, experts are people who are very busy and difficult to

be contacted. Therefore, using this method might be very time consuming and difficult to apply.

b) The Delphi is commonly applied to a large group size of between 30 to 100 people (Turoff et al., 1999). The number of experts in this research, however, is only fifteen.

Once the list of web usability criteria was gathered and verified by the experts, the list was analysed to classify between objective and subjective criteria. The classification is important because the benchmarking approach to be developed will only use objective criteria as the metrics. The subjective criteria, on the other hand, would be discussed in the framework as general guidelines to designers and developers of web sites. The classification process was performed through a two-hour brainstorming session involving three reviewers. All these reviewers possess strong knowledge in Multimedia Application Development, Information System, Networking respectively (see appendix II).

3.4.4 Questionnaire (Stage 3.1)

This method was chosen because in the researcher's opinion, it is one of the best ways to gather users' opinion and feedback on the web usability issues. Despite its limitations, this method allows the researcher to provide questions that can rigorously be analysed. Additionally, questionnaire survey also allows the possibility to engage more participants from the Internet user population compares to other methods such as interview, user testing and laboratory experiments. Furthermore, users' response will not be influenced by the presence of researchers or evaluators as in other usability evaluation methods. Cost effectiveness and quick results are also added advantages to using questionnaire. Presented below is a summary of the questionnaire used in this research:

- ***Goal and type of questionnaire survey***

  The goal was to identify the importance of each usability criteria pertaining to political web sites from the perspectives of users from different *sex, age,*

educational background, Internet experience, frequency of Internet usage, type of computer and Internet browser used, and type of Internet access. This survey used an online questionnaire that was published in a web page at URL http://www.mansci.strath.ac.uk/ cyberdemocracy/ survey.htm.

Sampling method

The target population was political web site users in Malaysia with the age over 18[4]. Due to its large number, it was almost impossible to get a census from all the population. In this survey, cluster analysis was used to draw representation from the target population. Cluster analysis was a method of sampling whereby the entire population is divided into clusters, and then some of these clusters are randomly selected (Emory & Cooper, 1991). In this survey, the target population was classified into four sub-groups as follows:

- Supporters of the ruling party;
- Supporters of the opposition party;
- Independent, and;
- Members of Pressure groups/ Non Governmental Organisation.

Then, the email groups/lists and discussion forum for each of the clustered groups were identified as listed in table 3.1.

Table 3.1: Email lists for sub groups of the target population

Email lists	*Sub groups*	*No.of members*
http://www.kmu.net.my	UMNO (ruling party)	625
Alternative-net@yahoogroups.com	Supporters of opposition	1501
Sangkancil@list.malaysia.net	Supporters of opposition	250
Bungaraya@listserv.net-gw.net	Supporters of Opposition	125
IslahNet@yahoogroups.com	NGO	1919
Abimlink@tropika.com	NGO	648
Uumnet@uum.edu.my	Independent	500
Ukmnet@ukm.edu.my	Independent	200*
Utm@utm.edu.my	Independent	150*
Cikgunet@yahoo.com	Independent	50*
Jpjnet@jpj.gov.my	Independent	50*
Sprnet@spr.gov.my	Independent	50*
GlamNet@yahoogroups.com	Independent	40
Total		**6268**

Note: * this is an estimated figure as the actual number is not provided

[4] In Malaysia, citizens above 18 are allowed to get involved in politics by joining political parties, pressure groups, youth movements or student organisations

Invitations to participate were sent through emails to these email-groups/ lists whose subscribers were Malaysian citizens of different biographical background. An online questionnaire form was published and its URL was mentioned in each email to respondents (refer appendix I). After a three months period (May 2001 until July 2001), 170 Internet users responded to the survey.

Type of data sought and questions

There were two types of data for this survey - factual or demographic and opinion data as outlined below:

- Factual/ Demographic (*age, sex, education, employment status, type of computer, browser and internet connection used, internet experience, frequency of internet use, and frequency of visits to political web sites*), and;
- Opinion (users provide their ratings on 56 web usability criteria).

The questions in the survey were divided into two - straightforward closed-ended questions for factual data and Likert-style closed-ended questions for opinion data (see appendix I).

Statistical Procedure

All the data received from the respondents were transferred into the SPSS computer application for statistical analysis. There were a total of 172 respondents but only 170 were accepted because 2 respondents did not provide their email addresses.

Table 3.2 shows the statistical techniques used for data analysis of this survey. There were two types of data involved in the analysis as below;

- Nominal data for demographic background (Part A), and;
- Interval data for criteria ratings (Part B).

When the data is in the form of categories, for example, gender (male and female), then the data is described as nominal (Wright, 1997). In this survey,

all the data for demographic information were considered nominal because of their categorical nature. The level of measurement used for this type of data was frequency distribution and percentages.

Likert scale of 1 to 5 was used for the ratings of the 56 usability criteria derived from stages 1 (usability criteria elicitation) and 2 (expert reviews). This scale was used to allow the respondents to provide their ratings based on the following bands:

1 = very important

2 = important

3 = undecided

4 = not important

5 = not at all important

Although most attitude and opinion scales produce ordinal data, most researchers treat the data as interval (Wright, 1997; Pilcher, 1990). The reasons for this are:

- Each response can be assigned with numeric values;
- The data can be ordered for analysis, and;
- The data would be able to tell the distance between pairs of points. Hence, in this case, the distance between 1 to 2, 2 to 3, 3 to 4, and 4 to 5 were considered the same.

For the above reasons, this survey treated the data for criteria rating as interval. Therefore, mean was used as a primary measure of central tendency, standard deviation was used as a measure of dispersion, and One Way Analysis of Variance (ANOVA) was used to test the significant difference between means.

Table 3.2: Statistical technique and levels of measurement

Statistical Technique	*Nominal*	*Interval*
Categorical description	Frequency Percentages	
Measures of central tendency	-	Mean Mode Median
Measures of central dispersion	-	Standard deviation
Test of Significance	-	One Way Analysis of Variance (ANOVA)

Apart from the techniques shown in table 3.2, correlation was also used to measure the relationship between SCANMIC usability factors – Screen Appearance, Content, Accessibility, Navigation, Media Use, Interactivity, and Consistency.

3.4.4.1 Pilot Questionnaire Survey (stage 3.1)

Introduction

Before any questionnaire survey, it is important to test the questionnaire for its practicality, reliability and validity. The pilot survey can also be used to test the suitability and adequacy of the items used. To be more specific, the pilot survey attempts to uncover the following questions:

Practicality:

- Are all the words used understood?;
- Do all respondents interpret the questions similarly?;
- Does the online survey form work effectively?, and;
- Is the language used suitable?.

Reliability:

- Are answers to all questions reliable?.

Validity:

- Does the obtained information appear to be what is expected?, and;
- Do all questions relate to the body of knowledge (i.e. web usability)?.

Questionnaire Design

Type of Questions

As mentioned earlier, the questions were divided into two parts, A and B (refer to appendix I). Questions in Part A were intended to extract factual and demographic information (e.g. age, sex, education and computing experience) from the respondents. Part B contained opinion-type questions that ask respondents to rate the importance of each usability criterion.

Technical problems

In order to use the online survey, an HTML form was designed. Once finished, a 'submit' button was added at the bottom of the form. The 'submit' button was used to send the form to a server where a common Gateway Interface (CGI) file that would process the form was residing. Due to the technical difficulty and security factor in using the CGI in the University's web server, a free CGI file offered by freecgi.com was used for this survey[5].

There were a few problems encountered while preparing and testing the online questionnaire form. One of them was the browser compatibility problem. The completed form had to be rewritten because it was not compatible with the Netscape browser. There was also a small problem in terms of using the right HTML codes for the survey forms.

Respondents

Eight people were invited to answer the questionnaire. Six were Malaysians who, at the time of writing, are studying in Scotland, and two were Iranian and Indonesian. All respondents were given the URL for the questionnaire and they answered the questionnaire at their own leisure time. However, after they submitted the questionnaire, they were being interviewed informally and asked a few questions about the questionnaire, for example, 'do you find it difficult to answer the questionnaire?', 'do you understand the questions asked?', and 'do you have any difficulty in submitting the questionnaire form?'. To test the reliability of the questionnaire, two respondents were requested to answer the questionnaire twice in two separate occasions (with 2 weeks gap).

Findings

Practicality of the Questionnaire

In general, most respondents said that the questions were well structured and easy to understand. However, some of them felt that the number of

questions was too many that could make respondents tired and bored. There was also a comment that some of the rating items were too long. Regarding the five rating scales used in this questionnaire, one respondent suggested using '5' as 'very important' and '1' as 'Not at all important' since she always thought that higher number represents better quality.

It was also found that the respondents would be able to interpret all questions similarly. On separate occasions, two respondents were informally interviewed with regards to their understandings on the questionnaire items. By and large, it could be said that the wordings of the questionnaire were simple and easily understood. Nonetheless, it was found that the value of '3' as 'unsure' should be changed to 'undecided' as the former was interpreted differently by different respondents.

Several respondents proposed the questionnaire to be translated into Malay language as the questionnaire were developed for the Internet users in Malaysia. They argued that not many of the potential respondents were good in English and they might misinterpret the statements presented in the questionnaire. Based on this suggestion, the questionnaires was made available in both English and Malay versions.

Reliability

All questionnaires should be reliable in the sense that when it is tested repeatedly, the result would be more or less the same (Poland, 1998). A test-retest method was used for this purpose where two respondents were requested to answer the questionnaire twice in two separate times. The response was then analysed and compared for reliability.

In general, the result shows a high reliability for all items used in the questionnaire. There was a 100 per cent consistency of the responses for part A (respondents' biography) when the two tests were compared. However, some inconsistencies were discovered for responses in part B.

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[5] The University where the research was performed did not allow the use of the CGI in its web server, therefore, a free CGI was used from http://www.free-cgi.com

This was not unexpected since respondents provided their ratings based on their opinion and experience. Despite the inconsistency between the two tests, the differences in mean scores were very small and they do not significantly affect reliability. The result is summarised as follows;

Screen Appearance

All twelve questions (S1 to S12) of the first test show consistent mean scores when compared with the second test of the same questions except questions S1 and S9 (refer to table 3.3). Although the two items show different mean scores, the difference is only at 0.50. This means that a respondent might answer 'very important' during the first test, but switched to 'important' during the second test.

Table 3.3: Test-Retest Mean Score for Screen Appearance

	Mean		
Items	1st Test	2nd Test	Mean Difference
S1	2.00	1.50	0.50
S2	1.50	1.50	0
S3	2.00	2.00	0
S4	4.00	4.00	0
S5	1.00	1.00	0
S6	2.00	2.00	0
S7	2.00	2.00	0
S8	1.00	1.00	0
S9	1.50	2.00	0.50
S10	2.50	2.50	0
S11	1.50	1.50	0
S12	2.50	2.50	0

Content

Unlike Screen Appearance, the ratings of all 20 questions (C1 to C20) related to Content show some minor inconsistency when the mean scores of the first test were compared to the second (refer to table 3.4). Despite eleven questions have the same mean scores between the two tests, the remaining nine questions produce the mean score difference of either 0. 50 or 1.00.

Table 3.4: Test-Retest Mean Score for Content

Items	1st Test	2nd Test	Mean Difference
C1	1.00	1.00	0
C2	1.00	1.50	0.5
C3	1.00	1.00	0
C4	1.00	2.00	1.0
C5	1.50	1.50	0
C6	1.50	2.00	0.5
C7	1.50	1.50	0
C8	3.00	3.00	0
C9	2.00	2.00	0
C10	1.00	2.00	1.0
C11	3.50	3.50	0
C12	2.00	2.00	0
C13	1.00	1.50	0.5
C14	1.50	1.50	0
C15	1.00	2.00	1.0
C16	1.50	1.50	0
C17	1.50	2.00	0.5
C18	4.00	4.00	0
C19	1.00	2.00	1.0
C20	2.00	2.50	0.5

Accessibility

All five questions for Accessibility (A1 to A5) show 100 percent consistent mean scores when the two tests were compared (refer to table 3.5). This means that both respondents provided the same ratings for the Accessibility items on both occasions.

Table 3.5: Test-Retest Mean Score for Accessibility

	Mean		
Items	1st Test	2nd Test	Mean Difference
A1	1.00	1.00	0
A2	2.00	2.00	0
A3	2.00	2.00	0
A4	2.00	2.00	0
A5	1.50	1.50	0

Navigation

Apart from the mean scores for items N3, N6 and N7, all items for Navigation were rated consistently during both tests (refer to table 3.6). The variation for the three items was however very small at 0.50.

Table 3.6: Test-Retest Mean Score for Navigation

	Mean		
Items	1st Test	2nd Test	Mean Difference
N1	1.00	1.00	0
N2	1.50	1.50	0
N3	1.50	2.00	0.5
N4	1.50	1.50	0
N5	2.00	2.00	0
N6	1.50	1.00	0.5
N7	2.00	2.50	0.5
N8	1.00	1.00	0

Media Use

All seven ratings for Media Use (M1 to M7) show consistent mean scores when the two tests were compared with the exception for item M4 and M5 (refer to table 3.7). Despite the small variation, no respondent rated any of the items as 'Not Important' or 'Not At All Important'.

Table 3.7: Test-Retest Mean Score for Media Use

	Mean		
Items	1st Test	2nd Test	Mean Difference
M1	2.00	2.00	0
M2	2.00	2.00	0
M3	2.50	2.50	0
M4	1.50	2.00	0.5
M5	1.00	1.50	0.5
M6	2.00	2.00	0
M7	2.00	2.00	0

Interactivity

The respondents also rated consistently most items for Interactivity except item I2 (refer to table 3.8). One of the respondents initially rated item I2 during the first test as 'Very Important', but then rated the same item as 'Important' during the second test. As a result, item I2 produced a 0.50 different mean score when the two tests were compared.

Table 3.8: Test-Retest Mean Score for Interactivity

	Mean		
Items	1st Test	2nd Test	Mean Difference
I1	2.50	2.50	0
I2	1.50	2.00	0.5
I3	3.00	3.00	0

Consistency

Unlike other categories, two of the three items for Consistency (T1 to T3) were rated inconsistently by the respondents (refer to table 3.9). One of the respondents rated item I1 as 'Very Important' during the first test but changed it as 'Important' during the second test. Similarly, one respondent rated item I3 as 'Not At All Important' during the first test, then switched to 'Not Important' during the second test.

Table 3.9: Test-Retest Mean Score for Consistency

	Mean		
Items	1st Test	2nd Test	Mean Difference
T1	1.00	1.50	0.5
T2	1.50	1.50	0
T3	3.50	2.50	1.0

Validity

The questionnaire is valid when it is used in the way for which it is intended (Nachmias et al., 1985). Despite many types of validity, this pilot study was carried out partly to test face validity and content validity. Face validity is concerned with the concept that tests whether the information obtained from the questionnaire serves its purposes (Poland, 1998). While content validity is related to the question of whether the questionnaire items cover the body of knowledge of the proposed survey. In this study, the body of knowledge is web usability.

Once again, the validity test was based on the subjective assessment of the researcher and several reviewers. Before the questionnaire was designed, a goal and objectives were formulated as explained earlier. The goal was to identify the importance of web usability from the Internet users' perspectives. The questionnaire consists of two parts - users' background and list web usability criteria. All items in part A was important to extract user information such as sex, age, education and Internet experience whereas Part B contained a list of web usability criteria to be rated by the Internet users. This list was derived from the literature and reviewed by the experts. As such, it can be said that the questionnaire was valid in

terms of face validity. The questionnaire was also valid in terms of its contents because it was reviewed by fifteen experts.

Data Analysis

Statistically, the number of respondents used for the pilot study is too small for data analysis purposes. Hence, no conclusion can be made from the results of this study. However, in general, it can be said that the results of the pilot survey have proven that the questionnaire items were practical, reliable, and valid.

3.4.5 User-Trials (Stage 3.2)

User-trials in this research was a method used to ensure that all participants in the survey had the opportunity to familiarise themselves with political web sites environment in terms of its features and contents. At the same time, they would be able to detect aspects of political web sites that affect their usage. Additionally, they would also be able to identify whether the contents of the selected sites meet their expectations.

User-trial is the most commonly used method in usability testing. While presenting his paper on 'How to Test Usability' in Web Design World Conference, July 21, 1999, Seattle, USA, Instone says that the best way to assess one's site's design and structure is to test it with actual users (Instone, 1999). Users are in fact the ones who would actually use the system and therefore one of the best ways to test the usability is to observe them. In his Alertbox, Nielsen states that there is only one valid way to gather usability data: observe real users as they use the evaluating site to accomplish real tasks (Nielsen, 1999b).

The intention of this research, however, was not to do the usability testing but merely to conduct user trials with the objective described earlier. Presented below is a summary of the user-trials for this research:

The goals of user-trials are:

1. To get participants familiarised themselves with the selected political web site environments;
2. To allow participants to identify common usability problems of the selected political web sites which affect their usage, and;
3. To allow participants to identify whether the contents of the selected political web sites meet their expectations.

These trials were targeted to the participants in the interview (refer to 3.4.6.1) who were not familiar with political web site environment. The trials were conducted based on informal interactive sessions where participants were allowed to 'think aloud' and discuss certain issues freely with the interviewer. The sessions took place at participants' workplaces or at homes where there was an access to the Internet. However, a backup storage of web sites to be evaluated was made available as a contingency plan in case of any network problem. Appointments with the participants were arranged prior to each user-trials session.

The materials used for the trials were:

- A list of political web site addresses (2 partisan and 3 non-partisan web sites), and;
- A pen and paper for the researcher to take notes of any point of interest during the observation and conversation during the session.

Each participant spent between 20-30 minutes to browse all selected web sites and there was a short break before he or she continued to the next so that issues of interest to a particular site were discussed. Comments, remarks and issues raised during the session were discussed during the interview, which followed immediately after the trials.

3.4.6 Interview (Stage 3)

The interview method was used for two different groups of participants - the Internet users in Malaysia and the political web site developers. Details on how these interviews were carried out are explained in this section.

3.4.6.1 Interview with the Internet Users (Stage 3.2)

Goals and Objective of the interview

The goal of the interview was to obtain general views and opinion on the usability issues of web sites particularly political web sites. The specific objectives were to identify web criteria (both generic and specific to political web sites) that affect usability and content usefulness.

Participants

40 Internet users were selected to participate in the interview (see appendix V). Out of this number, 11 participants underwent the user-trials. The reason for the user trials was to ensure that all participants started the interview session on the same footing in the sense that they were familiar with the political web sites environment.

Sampling Method

Convenience sampling was used due to lack of resources and time constraint. However, a simple clustering method was performed to ensure that participants represent the target population in terms of sex, age group, and level of education. The 40 participants were selected based the following criteria:

- Sex: Male and Female;
- Age: below 20, 20-30, 31-40, above 40;
- Education background: STPM (Higher Education Certificate)/ Diplomas and lower, Bachelors Degree, Masters Degree, PhD or higher.

Type of interview

A semi-structured interview method was used (refer to appendix VI). The mostly open-ended questions designed for the interview varied to suit context and they ranged from general to specific issues of web usability.

Location and Duration of Interview

The interviews took place either at the interviewees' work places or at their homes depending on the agreement made during the invitation phase. Most of the interview lasted about 45 minutes except those who had to undergo user trials that mostly lasted for about 2 hours.

Recording method

Notes were taken during the interview using survey forms. In addition, the whole conversation was also taped using the audio recording device. The notes taken during the interview were then being revised and edited after listening to the recorded tapes. Due to cost of tapes, only 8 tapes were used for the whole interviews. This means that the recorded tapes were deleted once the analysis was made.

Data analysis

Comments and issues raised during the sessions were analysed in terms of priority and key findings. Comparison of feedback between each interview session was made to set aside any redundancies. Data analysis was performed using the content analysis method suggested by Miles and Huberman (1994). The content analysis in this study involved 5 steps: first, decide what to analyse; second, decide on the level of analysis; third, decide whether to code for existence or frequency of concept; fourth, code the text; and finally, analyse the results. Step 1, 2 and 3 were called 'data reduction' phase while step 4 and 5 were named 'data display and conclusion verification' by Miles and Huberman (1994). The steps were described as follows;

Step 1: decide what to analyse

The information from each interview session (both recording tapes and notes) was summarised and recorded in a standard form (refer appendix VII). Only relevant information was recorded in the form. Altogether, there were forty (40) forms that were completed for analysis.

Step 2: decide the level of analysis

The level of analysis for part A (biography) and part B (general information) was fairly straightforward. Most of the responses for these parts were coded in single words. Analysis was not difficult as all responses convey the same meanings, for example, Sex ="male" or "female".

The difficult part to analyse was part C that contained information about web usability issues. Since different interviewees used different words to explain similar things, the coding was based on sets of words rather than single words. The main objective of the analysis was to discover web usability criteria, which were normally expressed in a combination of several words rather than a single word. For example, 'contrast use of colour for background and foreground' (a combination of 8 words), 'simple language' (a combination of 2 words), and 'the availability of list of contents' (a combination of 6 words). Additionally, the meanings of the criteria were also taken into consideration. Participants tended to use different words that convey the same meanings. For example, a criterion, 'acceptable page loading time', has the same meaning with the criterion 'avoid using pages that are too long to load'.

Step 3: decide whether to code for existence or frequency of concept

Because of the nature of the data, only concept frequency was coded for part A and B, for example, the number of male and female participants. However, both concept existence and frequency were used for coding the data in part C. This means that any usability criteria identified from each interview was not only coded on its existence but also on how many times it was mentioned by all participants. As for sets of words expressed by two or more participants that carried the same meaning, only one code was used. For example, the criterion 'use short paragraph' has the same meaning as 'do not write too many sentences within a paragraph', hence only the former was coded, with the frequency was coded as twice.

Step 4: code the text

The coding process was done manually and not by the computer programs. Manual coding was more practical because the computer program could not identify different phrases or sets of words that carry the same meanings.

Step 5: analyse the results

Once the data was properly coded, all parts of the questions were analysed based on the following items:

Part A: Participants' Biography

Sex, age range, education.

Part B: Internet Experience

Length of Internet use, Type of Internet application used, frequency of Internet use, Type of web sites visited, general reasons for visiting web sites, reasons for visiting political web sites, and frequency of visits to political web sites.

Part C: Web Usability Issues

Usability elements of good web sites, problems faced by users while visiting web sites, contents elements that attract users to visit and revisit web sites, and design elements that help users find information within web sites.

The result from part C was then compared to the SCANMIC Model derived from the usability criteria elicitation and the expert review.

3.4.6.2 Interview with political web developers (Stage 3.3)

Apart from getting the information from the Internet users, the researcher also conducted the interview survey with political web site developers in Malaysia. The goal of this survey was to identify views and opinion of political web developers with regards to the web usability issues

particularly pertaining to their strategies for publishing usable and useful web sites.

The main objectives were:

- to know the general purposes of political web sites;
- to identify developers' strategies to achieve the purposes;
- to identify whether they have achieved their objectives;
- to identify general problems they faced in developing and maintaining their web sites, and;
- to get their overall views on web elements that affect usability.

Participants

Ten major political web site developers in Malaysia were invited to participate in this survey but only five agreed to contribute (refer to Appendix VII). Four of the participants were representatives from four major political parties - UMNO (the ruling Party), PAS (the Islamic Party), MCA (the Chinese Party), and DAP (the Democratic Party). One participant works for Non-Governmental Organisation called ABIM (the Islamic Youth Organisation).

Type of interview

The interview was semi-structured where the questions were mostly open-ended and they range from general to specific (refer to Appendix VIII).

Place and Duration of Interview

All interviews were carried out at participants' work places. Proper appointments were arranged prior to each interview. Average time spent for each interview was about 60 to 75 minutes.

Recording method

Special forms were used to note key points during each interview. All the interview sessions were also recorded. After the interview, the notes taken

during the interview were compared with the recorded tapes. New forms were used to summarise the data from both the notes and the tapes.

Data analysis

All five completed forms derived from the survey were analysed comprehensively. The analysis followed the same processes as discussed in 3.4.6.1. The feedback from each interview session was compared, any key points were noted, and any redundancies were removed. The result was summarised in a new form for further analysis (refer to appendix IX).

3.4.7 Content Analysis of Political Web Sites (Stage 4)

The main objective of the content analysis was to discover the main elements of content coverage for political web sites. Since there were many types of political web sites that differ in term of their purposes and content coverage, the analysis would only concentrate on two types of political web sites - political parties and pressure groups sites. This does not mean that other type of web sites were totally ignored because some of them were integrated into political web sites (through hyper-links), for example, online political news, government agencies, and politicians' home pages. Hence, the contents of these types of web sites were also indirectly analysed.

The AIPD (Attract, Inform, Position, and Deliver) approach developed by Simeon (1999) was adopted for the content analysis mainly due to the following reasons:

- It was specifically developed for assessing content of web sites that relate to 4 different strategies namely Attracting, Informing, Positioning, and Delivery;
- It has been successfully tested on commercial web sites, but not on political web sites, and;
- To my knowledge, it is the only method currently available that is mostly suitable for this research.

The AIPD approach relates to the use of the benchmarking techniques in comparing the Attracting, Informing, Positioning and Delivering (AIPD) strategies of commercial web sites in order to clarify strategic opportunities and advantages. This approach was introduced by Simeon in his study on web site strategies of 68 American banks and 54 Japanese banks in 1999 (Simeon, 1999). Each of these strategies is explained as follows:

Attracting

One of the main objectives for establishing a presence on the Internet is to attract as many people as possible to visit one's web site (Berst, 1998). Therefore, web developers should use the right strategy so that many users are attracted to their sites. As we notice, different web sites use different techniques in attracting visitors. Companies selling gaming software for example, offer free games and demos to be downloaded. University libraries provide free access to online journals to students. Occasionally, we also find some web sites that offer free electronic mails and discussion forum for their visitors. These are examples of methods used to attract visitors.

Informing

Apart from advertising and conducting business transactions, most web sites are designed for information provision purposes (Ward & Codrai, 2001). Informing is, therefore, a strategic function of web site that is related to the provision of information to visitors. Providing the right information to the right audience could determine the success of a web site. An organisation fighting for the peaceful world, for example, should provide information on their mission, campaigns, and organisation structure. Political parties on the other hand, should supply information on their manifesto, policies and election candidates. Whereas university web sites normally provide information such as programmes offered, academic and services departments, library service, student affairs, and research activities.

Positioning

Services provided in a web site could create an image and help an organisation remain competitive (Simeon, 1999). The extent and type of

services offered will determine whether a web site has fully utilised its positioning strategy to gain reputation and competitive edge. Design layout and links to branches are examples of the criteria that can be used to evaluate the positioning strategy.

Delivery

Unlike other strategies, Delivery strategic function is related to the use of web technology in providing interactivity, reliability, security and speed of a web site. In other words, it relates to the way in which a web developer utilises current web technology such as search engines, online forms, databases and JAVA applets to boost its delivering capability to visitors.

In order to adopt the AIPD approach in assessing the content coverage of political web sites, elements of web contents that can be used as the criteria for assessing each strategic function have to be identified. For example, free gifts can be used as a criterion for the Attracting content strategy whereas local search engine is more suitable to be used as a criterion for the Delivery content strategy.

To achieve this, twenty political web sites from four different countries - Malaysia, United Kingdom, United States and Australia, were analysed comprehensively in terms of their contents (refer to Appendix XI). These countries were selected because each represents countries of different continents - Asia, Europe, America and Australia/Oceania. In addition, all these countries are practising parliamentary democracy and many political organisations in these countries have established their presence on the Internet for a number of years.

Analysing web content is a very difficult and tedious job. Apart from experience, it requires patience and computer knowledge. In this study, 3 reviewers were invited to participate (refer to appendix II). They possess different knowledge in Information Technology (IT) that is crucial for the analysis, and each specialises in different Information Technology areas of

Multimedia Design, Network Administration and Internet Service, and Information Management.

All reviewers were given a short briefing on the purpose of the study, the definition of the AIPD, the list of web sites to be reviewed, and the tasks that they should do. A small study room with two computers with Internet access was used for the review. The reviewers logged on to the Internet to visit all the listed web sites one by one. They then compared and discussed all key content elements in those web sites and categorised them into the appropriate AIPD strategic function. One reviewer acted as a mediator and note taker during the whole process. The web content analysis was carried out for a period of 4 days, where all reviewers spent about 2 hours daily. Towards the end of the brainstorming session, the mediator analysed the result, removed any duplication and listed down the key web content elements of each web site according to the four AIPD strategies.

3.4.8 Web Evaluation Framework Development: Benchmarking Approach (Stage 5)

Based on the results of data analysis on the usability criteria of political web sites (stage 1 to stage 4), a framework for evaluating the usability of political web site using the benchmarking approach was designed. The justifications for choosing this approach were as follows:

a) Ability to measure one's performance against competitors

Elmuti (1998) states that benchmarking is *a measuring method used by companies to improve many areas including human resources, information systems, customer processes, quality management, purchasing, and supplier management.* The normal goal of this approach is to identify the 'best practices' of other organisations so that it can be implemented in one's own operation. In web evaluation, benchmarking could be used to measure the performance of one's web site against others especially its competitors. By doing this, the usefulness of the web site could be improved accordingly.

b) Lack of guidelines and studies in this area

Despite a wide application in various aspects of organisations, *very little information* is available on how this approach can successfully be implemented in web sites evaluation. Indeed, there are a few attempts on using the approach in web evaluation as mentioned earlier in the literature review chapter (Simeon, 1999; Misic & Johnson, 1999) but neither of these concentrates on political web sites.

Benchmarking technique is not entirely new in computer system evaluation. One of the common techniques used in the usability testing called 'competitive usability testing' is almost identical to the benchmarking method. However, this method is mostly applied to evaluating computer systems rather than web sites. To date, there is no clear framework and guidelines on how benchmarking technique can be applied for web site evaluation.

c) Success of this approach in business

For many years, benchmarking technique has proven its success and widely been used in business (The Government Centre for Information Systems, 1995). Therefore, there is a need for a framework to test the applicability of this approach in web evaluation.

Based on the above justifications, a framework was designed on how the benchmarking method could be applied to measuring web sites particularly political web site. This framework is aimed at both technical and non-technical people who involve in the development of political web sites. Additionally, the framework shall be of help to those who plan to compare the level of usability of their web sites with their competitors'.

Among issues discussed in the framework were:

- Why benchmarking approach is needed?
- What to measure?
- Who should be involved?
- Who to compare with?

- How to perform benchmarking?
- How to analyse data from benchmarking?

3.5 Conclusions

Although there are many methods that can be used to measure web usability as outlined in the early part of this chapter, the main focus of this research is on the benchmarking approach - the approach that has proven its success in various parts of business research. However, this research has utilised several other methods in the process of developing the benchmarking framework, which include usability criteria elicitation (stage 1), expert review (stage 2), online questionnaire (stage 3.1), interview with the Internet users (stage 3.2.) and political web site developers (3.3), and content analysis of political web sites (stage 4). These methods were chosen based on their suitability and capability to meet the research objectives as specified in chapter 1.

Usability criteria elicitation was employed in order to compile a list of generic web usability criteria proposed by the leading figures and researchers in web usability areas. Expert review was used to allow the experts to verify and edit the usability list obtained from the usability criteria elicitation. The outcomes of both of these methods will be discussed in chapter 4.

Survey method was utilised to get the ratings of web usability criteria proposed by the experts in terms of their importance. It was also aimed at getting other web usability criteria that are specific to political web sites. The findings from the online questionnaire will be presented in chapter 5, and the findings from the interview with the Internet users and political web site developers will be explained in chapter 6. The final method is content analysis of political web sites, employed with the main objective of identifying content requirements of political web sites. The detail findings of the analysis will also be discussed in chapter 6.

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Chapter Four

The Identification of Generic Web Usability Criteria: Elicitation and Expert Review

4.1 Introduction

As explained earlier in the methodology chapter, the first objective of this research is to identify generic criteria of web usability. Two methods were employed to achieve this namely the usability criteria elicitation (Stage 1) and expert review (Stage 2). During stage 1, some selected literature on web usability including web design guides were analysed to elicit key web usability criteria. During stage 2, the list of web usability criteria derived from stage 1 was edited and verified by the participating experts. In addition, the experts were also requested to comment on the suitability of the criteria groupings (i.e. SCANMIC factors).

Once the final list was achieved, each of the criteria was analysed and classified into objective or subjective measures. A two-hour brainstorming

session involving three evaluators was organised for this purpose. All the three evaluators possess strong knowledge in multimedia application development, information system and retrieval, and networking respectively (see Appendix II).

This chapter will present findings on stage 1 (usability criteria elicitation) in section 4.2, and stage 2 (expert review) in section 4.3. The classification of web criteria into objective and subjective measure are also discussed in section 4.3.

4.2 Usability Criteria Elicitation (Stage 1): Findings

Major factors affecting web usability have been identified as discussed in section 2.5.2. This section will further explore each of the factors to identify their sub categories and criteria of web usability. A list of usability literature used in this analysis is provided in the methodology chapter (refer to 3.4.2).

a) Screen Appearance

In her article 'Effective Electronic Materials', Shirley (1999) divides screen design or layout into three categories - space provision, choice of colour, and readability. All of these are briefly described as follows:

Space provision

This refers to proper allocation of space for functions and content display provided in a web page to help users focusing their attention.

Choice of colour

Proper use of colour not only attracts users to visit a web site but also improves learnability and ease of use. In contrast, improper use of colour may degrade usability and thus hinders a first time visitor to revisit a web site. Proper use of colour is emphasised in almost all design guides. CNET Builder Web Design Guide (Benjamin, 1996), for example, provides a special section on how to use colour formatting including background colour appearance.

Readability

One of the main objectives of a web site is to provide a readable content. This is not easy to be achieved. The reason is that reading from a computer screen is different from reading from paper. Therefore, if a designer were to write for a web page by using a conventional paper writing format, the page would be a failure. Nielsen (1997a) argues that *users read 25 percent slower from a computer screen than a paper.*

Readability is related mostly to choice of fonts and text. Hypermedic.Com (1998) outlines a detail discussion about typography on the web including issues on type of fonts, leading and legibility, page appearance, word and letter spacing, and typographic colour. However, this guide, as also found in other design guides, fails to clearly argue the difference between san serif and serif fonts in improving readability. Furthermore, the issue of culture and environment within which the application is being used that might affect the preference for fonts and text are not specified.

Unlike most Web Design Guides, Shirley does not include scannability issue in her screen design guide. Designers should not only design for readability but also for scannability. Basically, *scannability* is indirectly associated with readability. Based on his on-going research on usability, Morkes and Nielsen (1997) say, as users find it difficult to read large volumes of information on screen, they prefer to scan text and pick out keywords, sentences, and paragraph of interest while skipping others, which are not related to their interest. In other words, users always skim rather than read web documents.

b) Consistency

There is an element of 'fear of the unknown' when users visit a web site for the first time. Although they might be familiar with the browser and hypertext application environment, the design of a web site is different from others. Some web sites might put the menu bar at the top of screen, while others might use a horizontal hypertext button at the bottom of the

screen. Some web sites prefer using frames to divide functional areas while others merely use colour boxes. Therefore, there will always be some elements of unfamiliarity on behalf of users when they visit a web site for the first time. In considering this, design consistency is important to speed up user's learning.

Yale Web Style Manual (Lynch & Horton, 1999) provides good insights on web design consistency. The guide suggests designers to provide consistent layout for title, subtitle, page footers, background, and navigation links and icons in terms of colour, size, space and fonts used.

c) Accessibility

One of the goals for having a web site is to attract visitors as many as possible from various locations. The basic way to achieve this is to ensure that the site is accessible to target users. By the word 'accessible', it means that users would not only be able to get connection to a web site, but also be able to browse all contents available. Theoretically, higher degree of accessibility could contribute towards higher level of usability.

Benjamin (1996) advises web site developer to take into consideration different Personal Computer(PC) platform, network connection, browsers, and browser versions in their design process. There are three elements of accessibility namely *loading time, browser compatibility, and search facility, which are defined as follows:*

Loading Time

Loading time is the time it takes for a network PC to download data and files from a server. In a much simpler word, it refers to how long users have to wait for a browser to download data and files from a web server. Logically, users could not tolerate long loading time. Nielsen says,

> *Web users are impatient: they want to get their answers immediately and do not want to be slowed down by cool*

> *features, mission statements or self-promoting grandstanding* (Nielsen, 1997b).

Although 'speed' is relative depending on users, the technology used to access the Internet, and web page content (uie.com[1]), Yale Style Manual (Lynch & Horton, 1999) ranks 'design for speed' as top priority by stating that the threshold of frustration for most computing tasks is around 10 seconds. Loading time is something that cannot be avoided by users and therefore design for speed should be one of the objectives in any web site development. Long loading times is determined mostly by Internet bandwidth. Bandwidth refers to the amount of data that can be transmitted through a network within a given time. A 56Kbps modem, for example, has the capability to download 52 kilobytes data per second. Nielsen's law of Internet Bandwidth states that:

> *A high-ends user's connection speed grows by 50 percent per year, designers must not take for granted that all users have fast Internet access. Designers must aim at optimal usability over 28.8 Kbps. This means that designers should not be too ambitious of using too many fancy graphics and animation as main features of their web sites, instead concentrate on proper delivery of contents* (Nielsen, 1998a).

Browser compatibility

As suggested by CNET Builder Web Design Guide and several others, designers should also consider different browsers used by surfers across the world. Additionally, although users might use two popular browsers of Microsoft Internet Explorer and Netscape Navigator, the browsers might differ in terms of their product versions. If a user has lower browser version, he or she might not be able to view certain graphics and Java applets applications.

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[1] Uie.com (1999). Docs in A Real World, User Interface Engineering [Online]. Available: http://world.std.com/|uieweb/realdocs.htm. [access: 2000, Jan 19]

This criterion should be included in measuring web sites' usability because logically users who bought computers two years ago might use lower browser versions compare to new PC buyers unless they upgrade the software versions regularly.

Search facility

Search facility has become a necessity for a web site particularly of a larger size. Providing this facility will speed up users search for information in a web site. One of studies run by Nielsen in the Sunsoft usability laboratories in 1994 found that search facility is highly recommended by the participants (Nielsen, 1997c).

d) Navigation

Some people believe that the best web site normally contains lots of graphics, animation, and colours. However, not many realise that the basis of an effective web site is its navigability. In her 'Designing Electronic Material' article, Parker (1999) states that good navigation in a Web site is comparable to a good road map. With good navigation, users know *where they are, where they've been, and where they can go* from their current position. In short, navigation could be the key to making the experience enjoyable and efficient.

CNET Builder Web Design Guide (Benjamin, 1996) proposes several elements of good web navigation including logical tree-like structure, limited list of contents or menu (not more than 7), limited number of linkages to the desired content (not more than 5) and navigational tools in all pages. Apart from these, other elements such as summary screen, button or text bar for "PREVIOUS", "NEXT" and "MAIN MENU" and unbroken links are suggested by Yale Style Manual (Lynch & Horton, 1999). While Comber (1996), highlights the need for meaningful link names, index of pages of topics and contextual links.

Although these guides are general in nature, the applicability of the navigation elements depends on many factors including user environment, user experience, technology platform, and culture.

e) Media use

The use of media such as graphics, images, animation and audio in web pages distinguishes it from information presentation on papers. Studies on online electronic materials have shown that the integration of this media keeps users attention and, when used effectively, can enhance usability. However, designers should take extra care when introducing all these elements as improper use of them may distract users and affect usability. Additionally, heavy utilisation of media elements consumes web site server's hard disk space and lengthens the downloading time. Microsoft Web Workshop (Keeker, 1999) provides a good introduction on how to properly manage multimedia elements on web. The main multimedia elements are sound, graphics, images, audio and video, which are explained below.

Sound

Some web sites embed audio as background music, downloadable audio files or on-the-fly audio clips. Sound may also be used in conjunction with animation or video. As with colour, sound can help improve or degrade usability.

Still Pictures (Graphics and Images)

There are things that cannot be described by words and thus the use of graphics and images is very helpful. Furthermore, in certain cases, graphics could be used to emphasise text, as the saying goes: "A picture is worth a thousand words".

Moving Pictures (Animation and Video)

The use of animation is normally for drawing the attention of users or assisting with understanding by demonstration. But, heavy use of

animation causes long downloading time and use up web servers' disk space. Political web sites should also utilise the benefit of multimedia elements. *Graphics* could be used for banners, logo, charts, and menu icons, *audio clips* could be used for speeches of political leaders and *video* could be used for political forum or discussions.

f) Interactivity

Interactivity is a broad term and can be misleading. However, this word, in the context of this research, is referring *to features in a web site that allow users to interact not only with the site owners or pre assigned personnel but also with other users.* Two-way communication is necessary especially for political web sites where people can communicate with political leaders and express their views on certain issues. Additionally, the features allow users to give feedback and comments on any issues raised by the web site. The introduction of the interactivity features such as email, guess book, on-line forms and net conference might enhance a web site's worthiness.

However, most web design guides including NETBuilder, Yale Style Manual, and WCA do not have a good coverage on this factor. They only emphasise the need for web sites to use interactive elements such as online forms and email for feedback purposes only. Yet, apart from content, interactivity can be considered an important factor that contributes towards highly usable web sites particularly political web sites.

g) Content

The question of what should be on a web page depends largely on the goals of the web site. Some intends to sell products and services, some offer free entertainment, some provide government information and so on. For political web sites, the main goals could be to gain more voters, to get people participate in political discussions, and to disseminate public

information. This once again depends on which type of political web sites whether they belong to individuals, government agencies, non-profit organisations, pressure groups, or political parties. However, one should bear in mind that providing content in a web page is not as easy as providing a printed page in a book. Yet, a designer should not run away from the basic elements of a document to ensure a web site's usefulness. In their 'Web Design Guide', Lynch and Horton (1999) outline four basic elements of a document which are not complicated, and have almost nothing to do with Internet technology: *who, what, when, and where,* described as follows:

Who

The first basic element is the question of "Who is speaking?" or "who is speaking this to me?" if we put it in users' perspective. This question is very important because it will determine the owner or originator of a web site. People are looking for information that is reliable and being originated by those whom they can trust (Harris, 1997; Alexander & Tate, 1999; Grassian, 1999). Therefore, a designer must tell the users who initiate a web site, whether an individual, an institution, a company or any other organisation.

What

This is the second basic element that refers to the question of "what is a web site offering?". One thing for certain is that users will not browse a web site without knowing what the site is offering. They must have some kind of ideas of what to browse. In relation to this, every web page should have a proper title to capture reader's attention. The document title is often the first thing browsers of World Wide Web documents see as the page comes up. Additionally, the page title will become the text of a browser's "bookmark" if the user chooses to add his or her page to their list of URLs.

Besides page titles, a web site should also provide a list of contents particularly in the main page. It can be presented in a lot of ways such as

icons and bulleted list. The content list in the main page will give ideas to users on different categories of information a site is about to present. What a site is presenting should match the title and users should not be cheated. For example, if a company is selling animated screen savers, it should not use 'free screen saver' as a title. By doing this, it could invite a user to visit one's main page but then he or she will turn away and never come back.

When

This is the third element of content that highlights the need of currency or timeliness of an information in a web page. Undoubtedly, timeliness is an important element in evaluating the worth of a document (Alexander & Tate, 1999; Elkordy, 2000). Frequent users will look for the date the information is updated. This is not uncommon as people are reading up-to-date newspapers, magazines and articles. One must remember that the aim of a web site is not only to attract first time surfers but also frequent users.

Where

The final element is 'Where' that relates to the need to inform users on the whereabouts of servers they are browsing from. The Web is a place where surfers virtually travel all around the world. Several keystrokes by a user will give connections to servers located in different countries. One moment a user is connected to a server in New York, minutes later, he or she travels to Tokyo. Hence, users should be informed about the country of origin or location of a web server.

Despite lengthy explanation on how to design good content, Lynch and Horton do not clearly emphasise the question of "what to publish?". Apart from title and list of contents, the actual content and text should also be discussed because they represent the main attraction to web surfers.

Potomac Knowledgeway Web Design Guide (2000) highlights the need for relevant, useful, interesting, up-to-date and accurate information.

Whereas, Comber (1996) discusses the importance of short page titles, meaningful headings and signed pages. Mounty (1999) also includes other elements of good content including challenging content that evokes emotion. Smith (1997) argues that the issue of scope of a web site is also related to web usability and content usefulness. Scope not only covers its breadth (coverage of subject) but also its depth (levels of details of subject). Designers should ensure that the scope of their web sites is adequate, if not comprehensive to attract visitors.

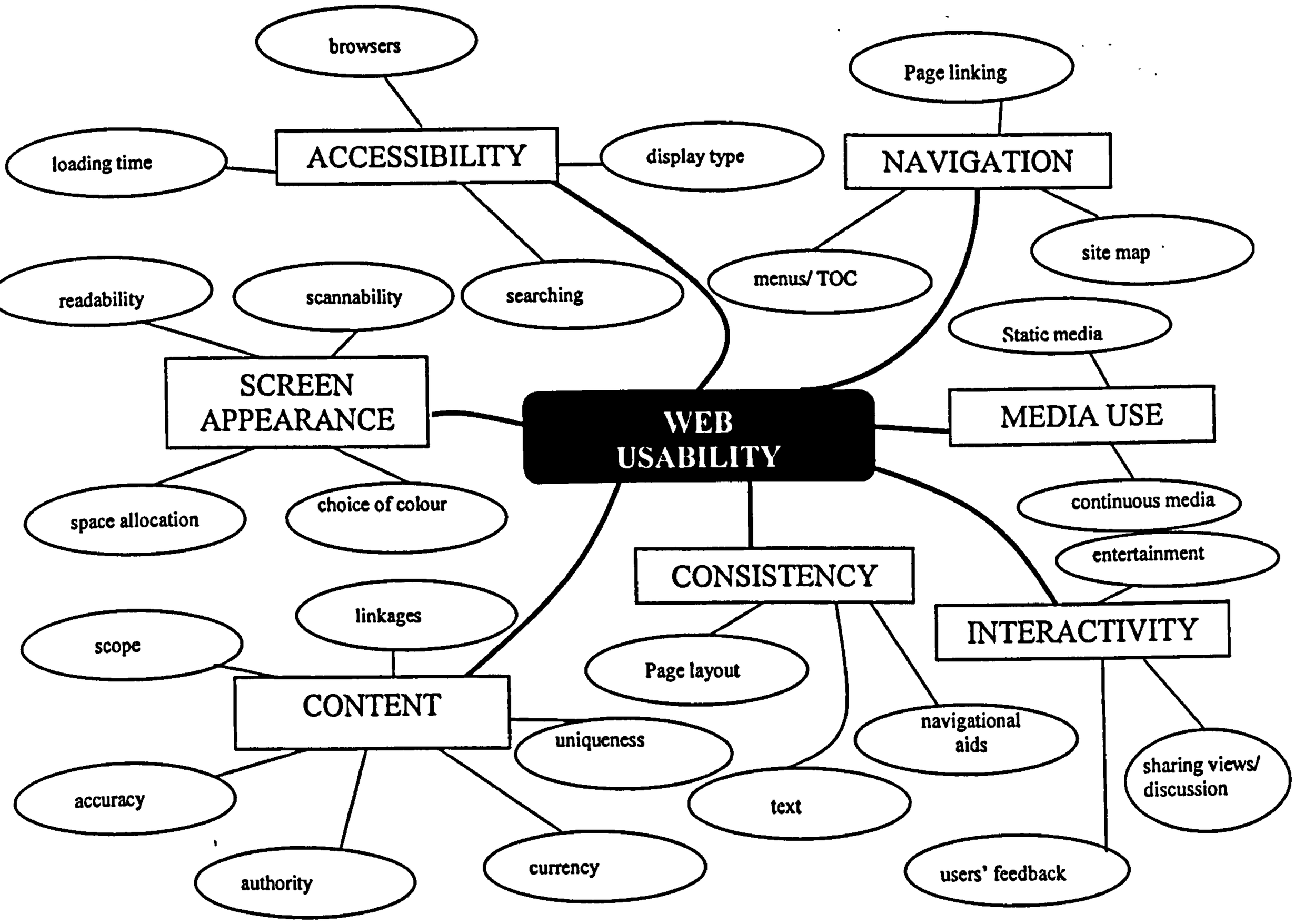
Besides reliability and accuracy, web evaluators should also look at the authority factor of web information (Susan, 1997). Examples of web page authority are information on authors, web site's sponsor, copyright statement, and page signature.

One thing for certain here is that some elements described above are absolute and some are relative. Up-to-date information for example, is crystal clear in its meaning. However, other elements, for example, valuable content is very subjective and they depend on the goals of users. For example, a user looking for a downloadable audio clip of a song might not consider the song's lyric as useful.

4.2 1 Summary on Analysis of SCANMIC Factors

Further analysis on web usability literature shows that the SCANMIC factors are indeed very important in determining the usability of web sites. Nonetheless, each of these factors is very broad and can be divided into a few sub categories that have been identified from the analysis. In each of these categories, there are a few generic criteria that are found to be vital to make web sites usable and useful. The SCANMIC model is summarised in figure 4.1. It should be noted that there might be other factors of web usability apart from the SCANMIC. These will be identified later (if any) through the empirical work (expert review and interview).

Figure 4.1 Factors affecting web usability: the SCANMIC Model (Hassan & Li, 2001)



Altogether, there are 69 generic criteria of web usability that were identified in stage 1. Each of these criteria was then being classified into its proper group within the SCANMIC factors based on their suitability and context. The complete list of the criteria (see appendix IV) arranged by their groupings was then sent to the experts for verification in stage 2, which will be discussed next.

4.3 Expert Review (Stage 2): Findings

The completed list of the 69 web usability criteria derived from stage 1 was sent to 36 experts for reviews and verification (see appendix III). After a three-month period, a total of 15 experts replied with their comments and suggestions, which were then analysed. Any redundancies and disagreements were removed, and any new criteria suggested by the experts were added to the

list. Groupings of the criteria were also refined wherever necessary. Finally, a refined list of 56 criteria was derived where they were classified into objective and subjective criteria through a brainstorming session as briefly described earlier in section 4.1.

Objective criteria are defined as *criteria that can normally be identified through existence and not influenced by individuals' perception.* Subjective criteria on the other hand, *are relative measures that can only be evaluated qualitatively based on evaluators' opinion and perception.* In practise, however, it is very difficult to draw the line that separates the definition between the two types of criteria. This was the main difficulty faced by the participants in the brainstorming session. In some cases, they found that some criteria could be classified as 'objective' but involved evaluators' perception as well. For example, the criterion "sharp colour contrast between text and its background", can be measured easily but the word 'contrast' might be perceived differently by different people.

A summary on the number of the web usability criteria arranged by the SCANMIC factors is shown in table 4.1.

Table 4.1: The number of web usability criteria arranged by SCANMIC factors

Grouping of Web Criteria	No of Criteria		
	Objective	Subjective	Total
Screen Appearance	8	4	12
Content	14	3	17
Accessibility	4	1	5
Navigation	5	3	8
Media use	5	3	8
Interactivity	3	0	3
Consistency	3	0	3
Total	42	14	56

The next sub-sections (4.3.1 to 4.3.7) describe the findings of the expert review on all criteria affecting web usability.

4.3.1 Screen Appearance

There are at least 4 sub-categories of Screen Appearance or Visual Layout - *spaces provision, choice of colour, readability, and scannability* (Lynch & Horton, 1999; Seminerio, 1998). All experts agreed that these are four very important areas of usability. More space should be allocated for contents and the variety of different screen types (e.g. mobile phones, palm tops, digital television etc.) should be taken into consideration. Additionally, proper use of colour not only attracts users to visit a web site but also improves learnability and ease of use.

Equally important is the issue of readability. Almost all experts agreed that a readable content is associated with choice of colour, fonts, and the use of colour for text and background. Apart form that; designers should not only design for readability but also for scannability. One of the criteria for scannability is the use of typography and skimming layout. The proposed list of web usability criteria for Screen Appearance is presented in table 4.2.

Table 4.2: List of Web Usability Criteria for Screen Appearance

Subcategory	Criteria for Screen Appearance	
	Objective	Subjective
Space allocation		• More space for contents than to other display elements (e.g. menu bar, list of contents & advertisement banners)
Choice of colour	• Non excessive use of colour for text • Sharp colour contrast between text and its background • Use of colour to differentiate functional area (e.g. tool bar, menu bar & list of contents) with content display area	
Readability	• Different text sizes to differentiate between titles, headings and texts • Avoidance of background images in the content display area	• Use of fonts that are easy to read
Scannability	• Clear titles for each pages • Clear headings, sub headings for text/ document • Use of typography and skimming layout (e.g. bold fonts and highlighted words	• Short paragraphs (use short sentences and limit a paragraph to only one idea) • Use the inverted pyramid writing style where you start with conclusion

4.3.2 Consistency

All experts agreed to the fact that designers need to provide consistent layout for title, subtitles, page footers, background, and navigation links and icons in terms of colour, size, space and fonts used. One expert said that consistency is very important to speed up the learning process on behalf of the users and to help frequent web users find information quickly. However, one of the experts suggested that minor changes be made to the structure of the screen appearance every now and then so that users will not get bored and banner blind. The proposed usability criteria for 'consistency' are shown is table 4.3.

Table 4.3: List of Web Usability Criteria for Consistency

Criteria for Consistency	
Objective	Subjective
• Consistent page layout (e.g. screen size for content display, banners, and menu bar). • Consistent use of text in terms of its type, font size and colour. • Consistent use of navigational aids (e.g. menu bar, buttons and links in terms of graphics metaphor, size and colour).	-

4.3.3 Accessibility

Attracting as many visitors as possible from various locations has been one of the goals of web developers. Thus, ensuring accessibility to the wide and disperse users should help attain the goal. As explained earlier in section 4.2 (c), the word 'accessible' in this research means that users would not only be able to get connection to a web site but also be able to browse all available contents. In this research, at least three elements of accessibility were noted - *loading time, browser compatibility, and search facility.*

All experts proposed that users should not be kept too long while waiting for a web page to load. However, they failed to have any agreement on the exact length of waiting time that would be considered acceptable by the users. This is due to the fact that loading time is different from one page to another depending on the content being downloaded. As such, one reviewer came up with a suggestion that the acceptable loading time should be between 10 to 20 seconds depending on its content.

Apart from loading time, designers should also consider different browsers with different versions used by the Internet users across the world. Additionally, few experts highlighted on the need to provide effective local search facility because it will speed up users search for information in a particular web site. This is consistent with the findings by Nielsen (1997a), which found that search facility is highly recommended by the participants. The proposed accessibility criteria of the web are shown in table 4.4.

Table 4.4: List of Web Usability Criteria for Accessibility

Subcategory	Criteria for Accessibility	
	Objective	Subjective
Loading speed		• Acceptable loading time
Display compatibility	• Compatible contents for all main browsers (Netscape and Microsoft Explorer) • Compatible contents between different versions of the same browser • Compatible display for different screen types (e.g. black & white, palm top and digital TV)	
Fast Content Retrieval	• The use of local search facility especially for medium and large web sites	

4.3.4 Navigation

As explained earlier in section 4.2 (d), the basic of an effective web site is its navigability. Good navigation in a Web site is comparable to a good road map. The findings from the expert review show that with good navigation such as logical tree-like structure, proper grouping of contents and use of navigational tools in all pages, users would know where they are, where they have been, and where they can go from their current position. In short, most experts believed that navigation is the key to making the experience enjoyable and efficient. The usability criteria proposed by the experts are listed in table 4.5.

Table 4.5: List of Web Usability Criteria for Navigation

Criteria for Navigation	
Objective	Subjective
• Menu/ list of key categories of contents in the main page • Menu/ list of key categories of contents in all sub-pages* • Links to the main page in all sub pages* • Accurate/ unbroken links • Use of sitemap	• The wording for each category of contents is meaningful to users • Contents should be grouped into a small number of key categories • Small number of steps/ links to arrive at a particular information (rule of thumb is 3)

Note : '*' these criteria are not applicable to web sites that use frames or separate windows for sub-pages.

4.3.5 Media Use

Presenting information on printed papers has its limitations because it can only use text and static pictures. Computer application however has an advantage in terms of being able to use more media elements including moving pictures (video and animation) and audio. All experts agreed that the integration of media elements could, not only get users attention but also enhance usability if used effectively. Nonetheless, they also accepted the fact that improper use of the media elements may distract users and affect usability. All experts also emphasised the need for providing alternative access of information whenever audio, animation and video elements are used to allow accessibility for those having browsers that do not support the elements. Table 4.6 presents the list of the proposed usability criteria for proper use of media.

Table 4.6: List of web usability criteria for Media Use

Subcategory	Criteria for Media Use	
	Objective	Subjective
Continuos/ time-based media (audio, animation and video)	• Control features for continuous media where appropriate (e.g. replay, control volume and turn off) • Alternative access (e.g. text version) to any information presented through continuous media • Avoidance of looping animation to prevent users' distraction	• Use of continuous media to suit content (e.g. demonstration, instruction, speeches, and speeches)
Static media (graphics, images, pictures)	• Labelling of all static media especially those used for menus and icons • Use of thumbnails to display photos	• Use of static media to enhance the information being presented • Non excessive use of static media in all pages

4.3.6 Interactivity

As mentioned in section 4.2 (f), 'interactivity' in this study, refers *to features in a web site that allow users to interact not only with the site owners or pre assigned personnel but also with other users.* The introduction of the interactivity features such as email, guess book, online forms and net forum might enhance a web site's worthiness in term of interactivity. While agreeing that these elements are important, some of the experts said that making them available are insufficient. Designers should take into consideration whether the elements are effective and easy to use especially when dealing with multiple forms. Three criteria were proposed and agreed by the experts as presented in table 4.7.

Table 4.7: List of web usability criteria for Interactivity

Criteria for Interactivity	
Objective	Subjective
• Availability of features for users' feedback about the site (e.g. web master's email address and on-line form). • Availability of features for sharing views and discussions (e.g. e-forum, net conference and net chatting) • Availability of entertainment features (e.g. online games and puzzles)	-

4.3.7 Content

Most experts agreed that some criteria for good content are related to basic requirements of a document including suitable language for audience, high quality writing with no grammatical and typographical errors, passages that are easy to read and understand, clear information about authors, and references are cited where applicable.

Apart from these, there are also other criteria that are equally important. Few experts suggested that merely having a section for press release and publication was not enough. Instead, web developers should ensure that these publications are updated and archived accordingly. There was also a suggestion that users are to be informed about the difference between internal and external links. In addition, providing a printer-friendly environment within web pages that offers long document could also boost usability. The

results of the expert review pertaining to the generic criteria of content usefulness are shown in table 4.8.

Table 4.8: List of generic criteria for Content usefulness

Sub-category	Criteria for Content	
	Objective	Subjective
Scope	• Suitable language for audience • Up-to-date publication (e.g. news, articles, working papers etc) • Archive of previously published materials	• Contents provided meet the expectation of target users
Accuracy	• Clear distinction between informational and opinion content	• High quality writing (e.g. good grammar and no typographical error) • Use of passages that are easy to understand
Authority	• Information on authors and other documents (e.g. names and affiliation) • References or sources of text and other documents • Background information of institution/ organisation/ owner of the site (i.e. logo, name, address, phone number and email address)	
Currency	• Up-to-date contents (i.e. provide resource date and page revision date).	
Uniqueness	• Options for output/ print format when appropriate (e.g. long pages and framed-based web pages) • Choices of language for multi-ethnic audience • Choices of media type for a particular information (e.g. text only, audio or video) • Information or warnings on file type and size for downloading	
Linkages	• Clear distinctions between internal and external links • Links to other relevant sites (e.g. state, local branches, sponsors)	

4.4 Conclusions

The first research objective is to identify key generic criteria of web usability. This has been achieved through the usability criteria elicitation (stage 1) and expert review (stage 2) where a list of 56 criteria in 7 different categories namely Screen Appearance, Consistency, Accessibility, Navigation, Media Use, Interactivity, and Content (SCANMIC), was identified.

The criteria for Screen Appearance mostly deal with issues such as space allocation for web elements, choice of colour, readability and scannability. Consistency criteria emphasise the need for consistent page layout, use of text in

terms of font's type, size, and colour, and use of navigational aids. The criteria for Accessibility concern with web design that allows fast loading, ensures display compatibility, and provides local searching facility. There are also criteria for Navigation which are related to among others, menu design, page linking, and site map. The criteria to measure the use of media are divided into two - those relating to proper use of static media and continuos media. Interactivity aspect of a web site is also considered important through this research including the need to provide features for users' feedback, discussion among users, and entertainment. Unlike other categories, Content is very broad and its criteria cover at least six areas - Scope, Accuracy, Authority, Currency, Uniqueness, and Linkages.

During the process of identifying the criteria, a few problems were encountered. Analysing web design guides and other selected literature during stage 1 was very exhaustive and time consuming, partly due to fact that some criteria are:

- described by using technical terms that are not understood by lay persons, thus they have to be rephrased;
- too general that need some elaboration;
- too specific that need to be generalised, and;
- phrased differently by different authors, thus thorough analysis is needed to remove redundancy.

In addition, placing each criterion into the right category was not an easy job. Despite the problems, a list of 69 web usability criteria was achieved and sent to the experts for review and verification.

Unlike stage 1, conducting the expert review in stage 2 was even more difficult. Apart from the difficulty in getting the participation, using experts were indeed very time consuming as they would participate only when they had free time, which would mean waiting for more than a month for each feedback. The data from the reviews were also difficult to analyse primarily because of the different views and suggestions from the experts. Nonetheless, the analysis was made based on the agreement among most of the experts. The results of the analysis produced a list of 56 web usability criteria that were grouped into 7 SCANMIC categories. The final list was then analysed in a brainstorming session by three

evaluators to differentiate between objective and subjective criteria. The list was then used in the online questionnaire survey in stage 3.1 where the respondents provided their ratings on the importance of each criterion. Detailed findings on the online questionnaire will be presented in chapter 5.

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Chapter Five

The Importance of Web Usability Criteria: Online Questionnaire Survey

5.1 Introduction

A list of 56 web usability criteria was identified through usability criteria elicitation (Stage 1) and expert review (Stage 2). The next stage is to identify the importance of these criteria from the perspective of the Internet users, which is the third objective of this research (refer to figure 3.2 in chapter 3). Online questionnaire was conducted where the target population was political web site users in Malaysia with the age over 18.

As explained earlier in the methodology chapter, cluster analysis was used to draw representation from the target population. The target population was classified into four sub groups as follows:

- Supporters of the ruling party;
- Supporters of the opposition party;

- Independent, and;
- Members of Pressure groups/ Non Governmental Organisation.

Then, the email groups/ lists and discussion forum for each of the clustered groups were identified (refer to table 3.1 in chapter 3). Invitations to participate were sent through emails to these email-groups/ lists whose subscribers were Malaysian citizens of different backgrounds. An online questionnaire form (refer to appendix I) was published and its URL was provided in each email to respondents.

After a three-month period (May 2001 until July 2001), 172 Internet users responded to the survey but only 170 were accepted because two respondents did not provide their email addresses. There were two types of data involved in the analysis as below:

- Nominal data for demographic background, and;
- Interval data for criteria ratings using likert scale of 1-5.

The statistical procedures used to analyse these data were already described in chapter 3 and summarised in table 3.2. The findings of the survey will be discussed in the next section.

5.2 Data Analysis of the Online Questionnaire Survey

5.2.1 Part A: Respondents' Biography

Table 5.1 shows the results of the survey in terms of respondents' background information. There were a total of 170 Internet users (i.e. respondents) of different background in terms of sex, age, education, job status, and knowledge area who participated in this survey. 59.4 percent were males while 40.6 percent were females. The respondents came from different age groups ranging from below 29 to above 50. The age group between 30 to 39 had the highest number of representatives (42.4 percent) followed by the age group between 18 to 29 (32.9 percent) and the age group of 40 to 49 (22.4 percent). Only 2.4 percent were 50 years old or older.

Table 5.1: Respondents' demographic information

Variables	Frequency	Percent
Gender:		
Female	69	40.6
Male	101	59.4
Total	170	100
Age:		
18-29	56	32.9
30-39	72	42.4
40-49	38	22.4
50 & above	4	2.4
	170	100
Education:		
SPM/ O level & below	11	6.5
High school diplomas	38	22.4
First degree	73	42.9
Masters degree	44	25.9
PhD	4	2.4
Total	170	100
Job Status:		
Employed	158	92.9
Unemployed	1	0.6
Student	11	6.5
Total	170	100
Knowledge area:		
IT/Computer Science	61	35.9
Engineering	18	10.6
Pure Science	6	3.5
Social Sciences	50	29.4
'Others	35	20.6
Total	170	100

It was found that about 70 percent of the respondents were university graduates where 73 had First degree, 44 had Masters degree and only 4 possessed PhD degree. The remaining participants were less educated where they only had high school diplomas (22.4 percent), and O-Level or below (6.5 percent). Most of the respondents were working (158 or 92.9 percent) except 11 respondents (6.5 percent) who were university or college students, and 1 (0.6 percent) who was unemployed.

Referring to table 5.1, the survey was also participated by the Internet users of different fields or knowledge area including IT and Computer Science (35.9 percent), Social Sciences (29.4 percent), Engineering (10.6 percent), and Pure Sciences (3.5 percent).

Table 5.2: Technology used to access the Internet

Variables	Frequency	Percent
Type of Computer:		
Pentium & equivalent	34	20.0
Pentium2 & equivalent	54	31.8
Pentium 3 or higher & equivalent	82	48.2
Total	170	100
Type of Browser:		
Netscape	51	30.0
Explorer	113	66.5
Others	6	3.5
Total	170	100
Browser version:		
Navigator 6+	7	4.1
Navigator 4.5+	20	11.8
Navigator 4.0+	3	1.8
Navigator 3.0+	1	.6
Explorer 6+	4	2.4
Explorer 5+	48	28.2
Explorer 4+	7	4.1
Not Given	80	47.1
Total	170	100
Internet connection:		
Modem	60	35.3
Local Area Network	110	64.7
Total	170	100

Table 5.2 presents information on the technology used by the respondents to get access to the Internet. Although about half of the respondents (48.2 percent) were using computers with powerful processors (Pentium III or equivalent), some of them were still using lower range processors. 20 percent of the participants got accessed to the Internet by using only Pentium or equivalent computers and 31.8 percent used Pentium II or equivalent computers.

As expected, most of the respondents used Netscape (30 percent) or Internet Explorer (66.5 percent) browsers to access web sites. Only 6 percent of the participants preferred using other less popular browsers. When it comes to the browser versions used by the respondents, the result shows that the most common browser versions used were Explorer 5+ (28.2 percent) and Navigator 4.5+ (11.8 percent). Nonetheless, other versions either of lower or higher versions than these two, were still being used by the respondents. The figures for the browser versions would probably be different should more respondents specify their preferences. Unfortunately, about 47 percent of them did not provide the information on this.

The survey also found that most of the respondents (refer to table 5.2) were connected to the Internet through Local Area Network (LAN). These participants normally used the network computers available in their workplaces. For those who log onto the Internet from their homes, they would use modem device. In this survey, 35.3 percent respondents used modem connection.

Table 5.3: Respondents' Internet experience

Variables	Frequency	Percent
Internet Experience:		
1 year or less	5	2.9
2 - 3 years	33	19.4
more than 3 years	132	77.6
Total	170	100
Frequency of Internet Use:		
Always (everyday)	132	77.6
Seldom (few times a week)	34	20.0
Occasionally (few times a months)	4	2.4
Total	170	100
Visits to political web sites:		
Yes	170	100
No	0	0
Total	170	100
Frequency of political sites visits:		
Always (everyday)	41	24.1
Seldom (few times a week)	54	31.8
Occasionally (few times a months)	75	44.1
Total	170	100

The information on the respondents' Internet experience is shown in table 5.3. From the table, it can be said that most of the respondents (77.6 percent) were experienced Internet users since they had been using the Internet for more than three years. Only 2.9 percent participants had Internet experience of equal to or less than a year. In addition, 77.6 percent of the respondents were using the Internet daily. This figure supports the argument that most respondents were expert Internet users.

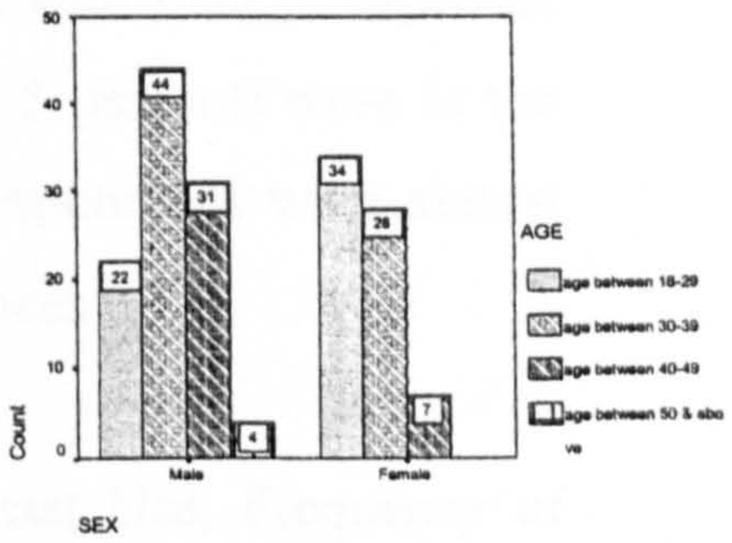
The table also provides the findings that the survey has achieved its objective in getting the respondents who have some experience visiting political web sites. All respondents in this survey ticked "YES" to the question "have you ever visited political web sites such as those belong to political parties, pressure groups and Non Governmental organizations? ".

Despite having some experience in visiting political web sites, a great number of the participants (44.1 percent) visited such sites only occasionally (few times a month). Only 31.8 percent visited the sites several times a week and 24.1 percent visited everyday.

Figure 5.1: Crosstabulation (Gender with Age, Education, and fields)

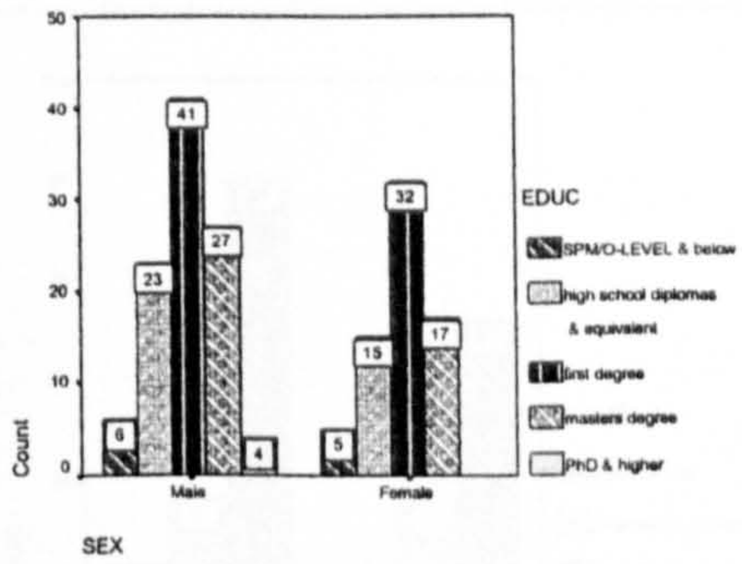
SEX * AGE Crosstabulation

			AGE				Total
			age between 18-29	age between 30-39	age between 40-49	age between 50 & above	
SEX	Male	Count	22	44	31	4	101
		% within SEX	21.8%	43.6%	30.7%	4.0%	100.0%
		% within AGE	39.3%	61.1%	81.6%	100.0%	59.4%
		% of Total	12.9%	25.9%	18.2%	2.4%	59.4%
	Female	Count	34	28	7		69
		% within SEX	49.3%	40.6%	10.1%		100.0%
		% within AGE	60.7%	38.9%	18.4%		40.6%
		% of Total	20.0%	16.5%	4.1%		40.6%
Total		Count	56	72	38	4	170
		% within SEX	32.9%	42.4%	22.4%	2.4%	100.0%
		% within AGE	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	32.9%	42.4%	22.4%	2.4%	100.0%



SEX * EDUC Crosstabulation

			EDUC					Total
			SPM/O-LEVEL & below	high school diplomas & equivalent	first degree	masters degree	PhD & higher	
SEX	Male	Count	6	23	41	27	4	101
		% within SEX	5.9%	22.8%	40.6%	26.7%	4.0%	100.0%
		% within EDUC	54.5%	60.5%	56.2%	61.4%	100.0%	59.4%
		% of Total	3.5%	13.5%	24.1%	15.9%	2.4%	59.4%
	Female	Count	5	15	32	17		69
		% within SEX	7.2%	21.7%	46.4%	24.6%		100.0%
		% within EDUC	45.5%	39.5%	43.8%	38.6%		40.6%
		% of Total	2.9%	8.8%	18.8%	10.0%		40.6%
Total		Count	11	38	73	44	4	170
		% within SEX	6.5%	22.4%	42.9%	25.9%	2.4%	100.0%
		% within EDUC	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	6.5%	22.4%	42.9%	25.9%	2.4%	100.0%



SEX * FIELD Crosstabulation

			FIELD					Total
			IT & Computer Science	engineering	Pure Science	Social Science	Others	
SEX	Male	Count	31	12	4	34	20	101
		% within SEX	30.7%	11.9%	4.0%	33.7%	19.8%	100.0%
		% within FIELD	50.8%	66.7%	66.7%	68.0%	57.1%	59.4%
		% of Total	18.2%	7.1%	2.4%	20.0%	11.8%	59.4%
	Female	Count	30	6	2	16	15	69
		% within SEX	43.5%	8.7%	2.9%	23.2%	21.7%	100.0%
		% within FIELD	49.2%	33.3%	33.3%	32.0%	42.9%	40.6%
		% of Total	17.6%	3.5%	1.2%	9.4%	8.8%	40.6%
Total		Count	61	18	6	50	35	170
		% within SEX	35.9%	10.6%	3.5%	29.4%	20.6%	100.0%
		% within FIELD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	35.9%	10.6%	3.5%	29.4%	20.6%	100.0%

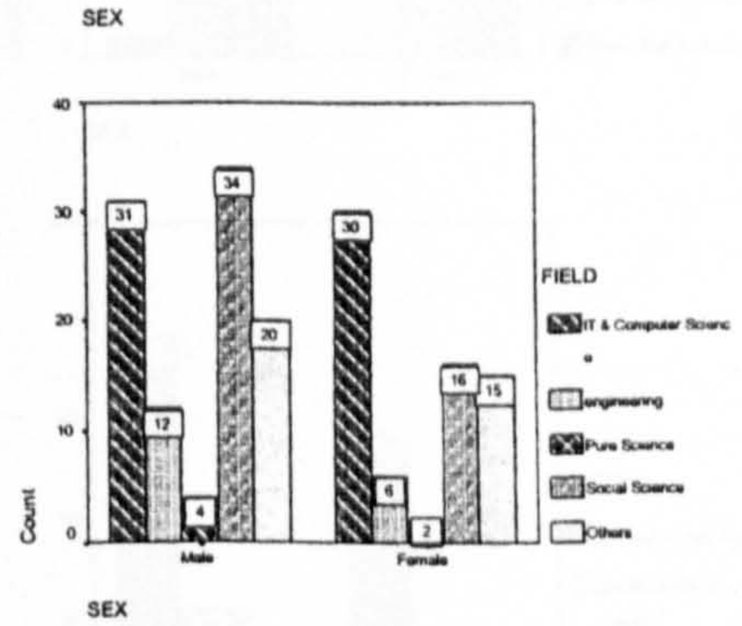


Figure 5.1 presents the cross-tabulation data and bar chart of the respondents' gender (SEX) with age groups (AGE), education (EDUC) and fields of expertise (FIELD). When comparing SEX with age groups, there are two interesting points worth mentioning. First, female respondents were more represented within the age group of 18 to 29. The first table within figure 5.1 shows that 60.7 percent of the respondents, whose age were between 18-29, were females. Second, all 4 respondents who had PhD degree were males.

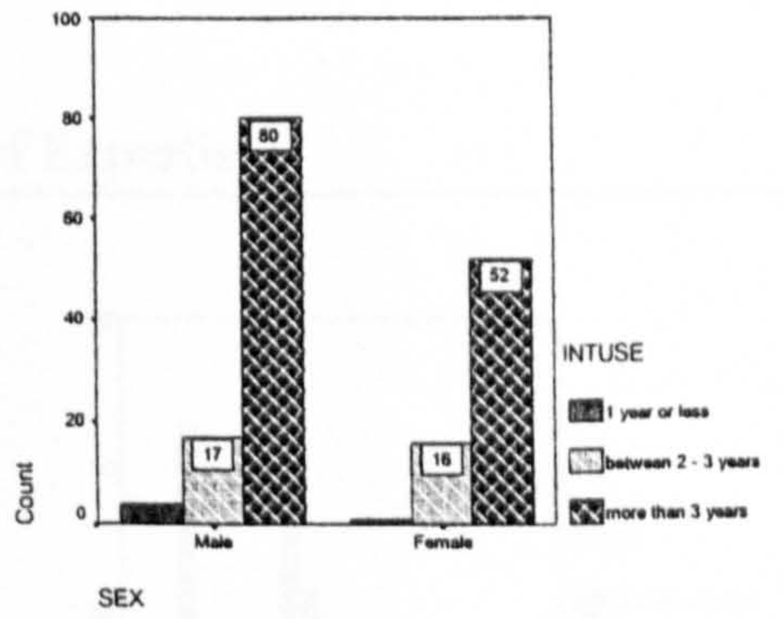
When SEX was crosstabulated with EDUC, the same pattern exists where both male and female groups were monopolized by those who held first degree certificates. The only difference was that in male category, the lowest number of participants was the group whose highest qualification was PhD, while in female category, the lowest number of respondents belonged to the group of SPM or O-Levels certificates holders.

Apart from AGE and EDUC, SEX was also compared with field of expertise where it was found that many female respondents (43.5 percent) were in the fields of IT or Computer Science. In contrast, male respondents were almost equally represented in both fields of IT and Social Sciences.

Figure 5.2: Crosstabulation (Gender with Length of Internet Use, Frequency of Internet Use, and Frequency of Visits to Political Sites)

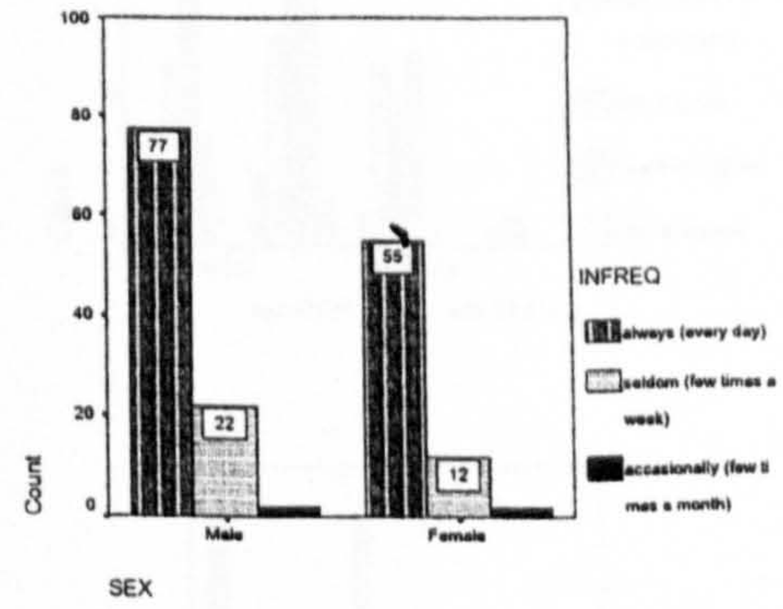
SEX * INTUSE Crosstabulation

			INTUSE			
			1 year or less	between 2 - 3 years	more than 3 years	Total
SEX	Male	Count	4	17	80	101
		% within SEX	4.0%	16.8%	79.2%	100.0%
		% within INTUSE	80.0%	51.5%	60.6%	59.4%
		% of Total	2.4%	10.0%	47.1%	59.4%
	Female	Count	1	16	52	69
		% within SEX	1.4%	23.2%	75.4%	100.0%
		% within INTUSE	20.0%	48.5%	39.4%	40.6%
		% of Total	.6%	9.4%	30.6%	40.6%
Total		Count	5	33	132	170
		% within SEX	2.9%	19.4%	77.6%	100.0%
		% within INTUSE	100.0%	100.0%	100.0%	100.0%
		% of Total	2.9%	19.4%	77.6%	100.0%



SEX * INFREQ Crosstabulation

			INFREQ			
			always (every day)	seldom (few times a week)	accasionally (few times a month)	Total
SEX	Male	Count	77	22	2	101
		% within SEX	76.2%	21.8%	2.0%	100.0%
		% within INFREQ	58.3%	64.7%	50.0%	59.4%
		% of Total	45.3%	12.9%	1.2%	59.4%
	Female	Count	55	12	2	69
		% within SEX	79.7%	17.4%	2.9%	100.0%
		% within INFREQ	41.7%	35.3%	50.0%	40.6%
		% of Total	32.4%	7.1%	1.2%	40.6%
Total		Count	132	34	4	170
		% within SEX	77.6%	20.0%	2.4%	100.0%
		% within INFREQ	100.0%	100.0%	100.0%	100.0%
		% of Total	77.6%	20.0%	2.4%	100.0%



SEX * VISFREQ Crosstabulation

			VISFREQ			
			always (every day)	seldom (few times a week)	accasionally (few times a month)	Total
SEX	Male	Count	34	38	29	101
		% within SEX	33.7%	37.6%	28.7%	100.0%
		% within VISFREQ	82.9%	70.4%	38.7%	59.4%
		% of Total	20.0%	22.4%	17.1%	59.4%
	Female	Count	7	16	46	69
		% within SEX	10.1%	23.2%	66.7%	100.0%
		% within VISFREQ	17.1%	29.6%	61.3%	40.6%
		% of Total	4.1%	9.4%	27.1%	40.6%
Total		Count	41	54	75	170
		% within SEX	24.1%	31.8%	44.1%	100.0%
		% within VISFREQ	100.0%	100.0%	100.0%	100.0%
		% of Total	24.1%	31.8%	44.1%	100.0%

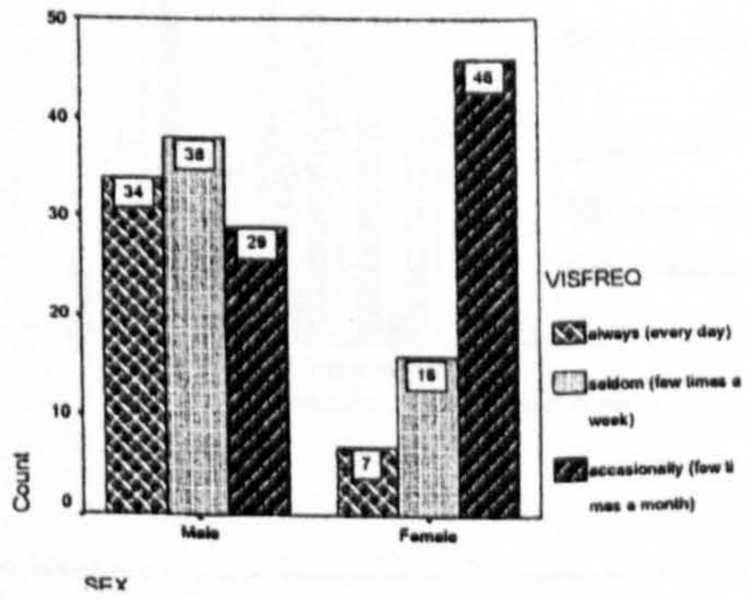


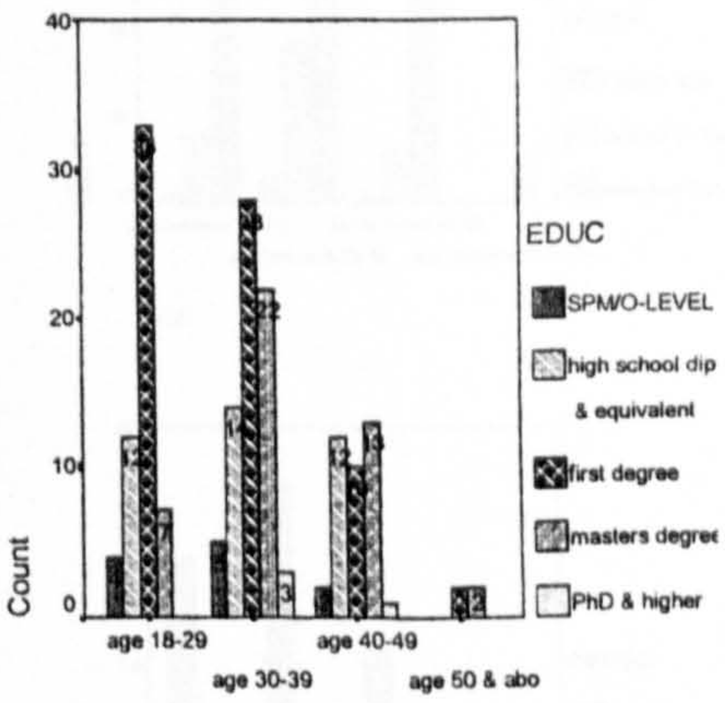
Figure 5.2 provides the cross-tabulation data between gender (SEX) with Length of Internet Use (INTUSE), Frequency of Internet Use (INFREQ), and Frequency of Visits to Political Sites (VISFREQ). The same patterns can be seen on the bar charts that compare SEX with INTUSE and SEX with INFREQ. In the former case, most respondents of both genders had been using the Internet for more than 3 years, while in the later case; most of the respondents of both sexes were using the Internet very frequently.

A major difference exists when comparing gender with VISFREQ. The third chart at the bottom of figure 5.2 shows that the number of male participants was almost equally distributed between the 3 types of visit frequency. In contrast, the data distribution for female participants varied significantly across the 3 types of visit frequency. It appears that about three-quarter (66.7 percent) of female participants only visited political web sites a few times a month.

Figure 5.3: Crosstabulation (Age with Education and Fields of Expertise)

AGE * EDUC Crosstabulation

			EDUC					
			SPM/O-LEVEL & below	high school diplomas & equivalent	first degree	masters degree	PhD & higher	Total
AGE	age between 18-29	Count	4	12	33	7		56
		% within AGE	7.1%	21.4%	58.9%	12.5%		100.0%
		% within EDUC	36.4%	31.6%	45.2%	15.9%		32.9%
		% of Total	2.4%	7.1%	19.4%	4.1%		32.9%
	age between 30-39	Count	5	14	28	22	3	72
		% within AGE	6.9%	19.4%	38.9%	30.6%	4.2%	100.0%
		% within EDUC	45.5%	36.8%	38.4%	50.0%	75.0%	42.4%
		% of Total	2.9%	8.2%	16.5%	12.9%	1.8%	42.4%
	age between 40-49	Count	2	12	10	13	1	38
		% within AGE	5.3%	31.6%	26.3%	34.2%	2.6%	100.0%
		% within EDUC	18.2%	31.6%	13.7%	29.5%	25.0%	22.4%
		% of Total	1.2%	7.1%	5.9%	7.6%	.6%	22.4%
	age between 50 & above	Count			2	2		4
		% within AGE			50.0%	50.0%		100.0%
		% within EDUC			2.7%	4.5%		2.4%
		% of Total			1.2%	1.2%		2.4%
Total		Count	11	38	73	44	4	170
		% within AGE	6.5%	22.4%	42.9%	25.9%	2.4%	100.0%
		% within EDUC	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	6.5%	22.4%	42.9%	25.9%	2.4%	100.0%



AGE * FIELD Crosstabulation

			FIELD					
			IT & Computer Science	engineering	Pure Science	Social Science	Others	Total
AGE	age between 18-29	Count	28	6	1	11	10	56
		% within AGE	50.0%	10.7%	1.8%	19.6%	17.9%	100.0%
		% within FIELD	45.9%	33.3%	16.7%	22.0%	28.6%	32.9%
		% of Total	16.5%	3.5%	.6%	6.5%	5.9%	32.9%
	age between 30-39	Count	20	10	3	27	12	72
		% within AGE	27.8%	13.9%	4.2%	37.5%	16.7%	100.0%
		% within FIELD	32.8%	55.6%	50.0%	54.0%	34.3%	42.4%
		% of Total	11.8%	5.9%	1.8%	15.9%	7.1%	42.4%
	age between 40-49	Count	12	2	2	10	12	38
		% within AGE	31.6%	5.3%	5.3%	26.3%	31.6%	100.0%
		% within FIELD	19.7%	11.1%	33.3%	20.0%	34.3%	22.4%
		% of Total	7.1%	1.2%	1.2%	5.9%	7.1%	22.4%
	age between 50 & above	Count	1			2	1	4
		% within AGE	25.0%			50.0%	25.0%	100.0%
		% within FIELD	1.6%			4.0%	2.9%	2.4%
		% of Total	.6%			1.2%	.6%	2.4%
Total		Count	61	18	6	50	35	170
		% within AGE	35.9%	10.6%	3.5%	29.4%	20.6%	100.0%
		% within FIELD	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
		% of Total	35.9%	10.6%	3.5%	29.4%	20.6%	100.0%

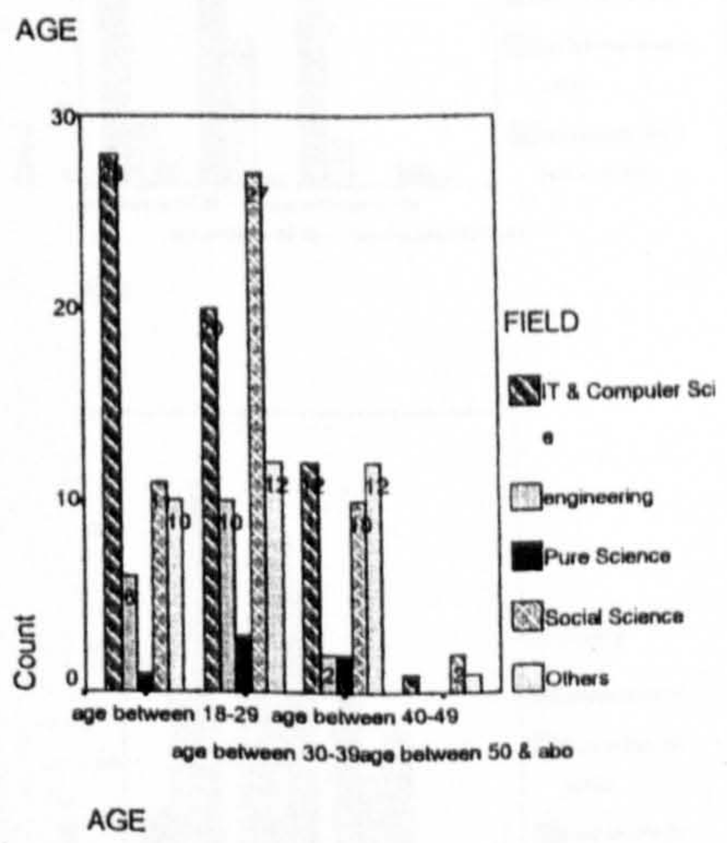
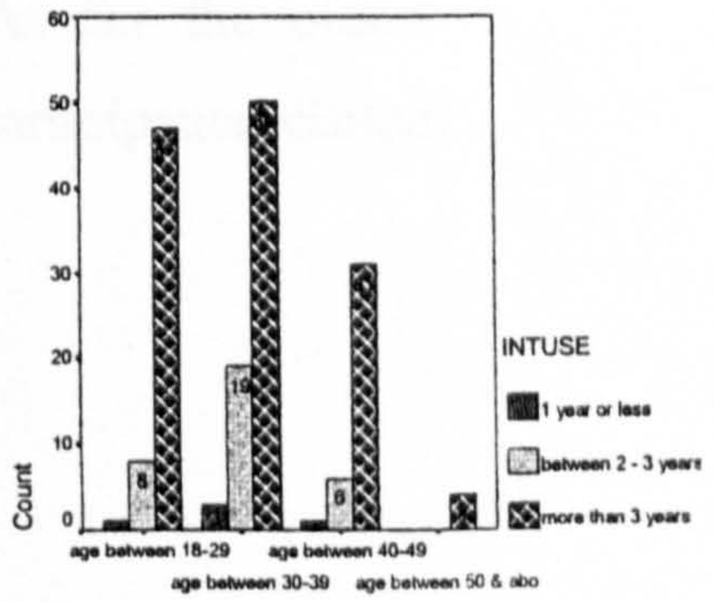


Figure 5.3 presents the findings on the data crosstabulation between AGE with Education (EDUC) and Fields of Expertise (FIELD). It is found that the ages of most respondents who held First degree fell within the age groups of either 18 to 29 or 30 to 39. However, the number of respondents who held Masters degree and high school diplomas slightly exceeded First degree holders in the age group of 40 to 49. Two main points should be raised when comparing AGE with FIELD. Half of the respondents whose area of expertise was IT and Computer Science belonged to the age group of 18 to 29. However, the age group between 30 to 39 was highly represented by respondents whose area of expertise was Social Science.

Figure 5.4: Crosstabulation (Age with Length of Internet Use, Frequency of Internet Use and Frequency of Visits to Political Web Sites)

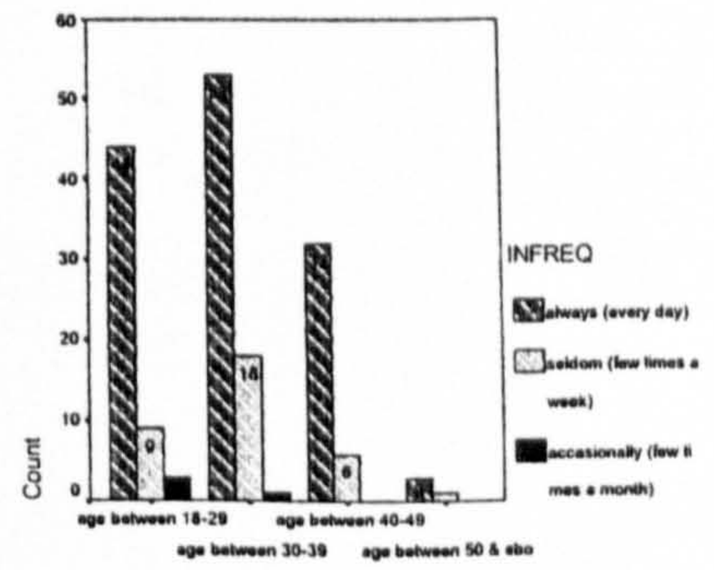
AGE * INTUSE Crosstabulation

			INTUSE			
			1 year or less	between 2 - 3 years	more than 3 years	Total
AGE	age between 18-29	Count	1	8	47	56
		% within AGE	1.8%	14.3%	83.9%	100.0%
		% within INTUSE	20.0%	24.2%	35.6%	32.9%
		% of Total	.6%	4.7%	27.6%	32.9%
	age between 30-39	Count	3	19	50	72
		% within AGE	4.2%	26.4%	69.4%	100.0%
		% within INTUSE	60.0%	57.6%	37.9%	42.4%
		% of Total	1.8%	11.2%	29.4%	42.4%
	age between 40-49	Count	1	6	31	38
		% within AGE	2.6%	15.8%	81.6%	100.0%
		% within INTUSE	20.0%	18.2%	23.5%	22.4%
		% of Total	.6%	3.5%	18.2%	22.4%
	age between 50 & above	Count			4	4
		% within AGE			100.0%	100.0%
		% within INTUSE			3.0%	2.4%
		% of Total			2.4%	2.4%
Total		Count	5	33	132	170
		% within AGE	2.9%	19.4%	77.6%	100.0%
		% within INTUSE	100.0%	100.0%	100.0%	100.0%
		% of Total	2.9%	19.4%	77.6%	100.0%



AGE * INFREQ Crosstabulation

			INFREQ			
			always (every day)	seldom (few times a week)	accasionally (few times a month)	Total
AGE	age between 18-29	Count	44	9	3	56
		% within AGE	78.6%	16.1%	5.4%	100.0%
		% within INFREQ	33.3%	26.5%	75.0%	32.9%
		% of Total	25.9%	5.3%	1.8%	32.9%
	age between 30-39	Count	53	18	1	72
		% within AGE	73.6%	25.0%	1.4%	100.0%
		% within INFREQ	40.2%	52.9%	25.0%	42.4%
		% of Total	31.2%	10.6%	.6%	42.4%
	age between 40-49	Count	32	6		38
		% within AGE	84.2%	15.8%		100.0%
		% within INFREQ	24.2%	17.6%		22.4%
		% of Total	18.8%	3.5%		22.4%
	age between 50 & above	Count	3	1		4
		% within AGE	75.0%	25.0%		100.0%
		% within INFREQ	2.3%	2.9%		2.4%
		% of Total	1.8%	.6%		2.4%
Total		Count	132	34	4	170
		% within AGE	77.6%	20.0%	2.4%	100.0%
		% within INFREQ	100.0%	100.0%	100.0%	100.0%
		% of Total	77.6%	20.0%	2.4%	100.0%



AGE * VISFREQ Crosstabulation

			VISFREQ			
			always (every day)	seldom (few times a week)	accasionally (few times a month)	Total
AGE	age between 18-29	Count	6	16	34	56
		% within AGE	10.7%	28.6%	60.7%	100.0%
		% within VISFREQ	14.6%	29.6%	45.3%	32.9%
		% of Total	3.5%	9.4%	20.0%	32.9%
	age between 30-39	Count	18	29	25	72
		% within AGE	25.0%	40.3%	34.7%	100.0%
		% within VISFREQ	43.9%	53.7%	33.3%	42.4%
		% of Total	10.6%	17.1%	14.7%	42.4%
	age between 40-49	Count	16	9	13	38
		% within AGE	42.1%	23.7%	34.2%	100.0%
		% within VISFREQ	39.0%	16.7%	17.3%	22.4%
		% of Total	9.4%	5.3%	7.6%	22.4%
	age between 50 & above	Count	1		3	4
		% within AGE	25.0%		75.0%	100.0%
		% within VISFREQ	2.4%		4.0%	2.4%
		% of Total	.6%		1.8%	2.4%
Total		Count	41	54	75	170
		% within AGE	24.1%	31.8%	44.1%	100.0%
		% within VISFREQ	100.0%	100.0%	100.0%	100.0%
		% of Total	24.1%	31.8%	44.1%	100.0%

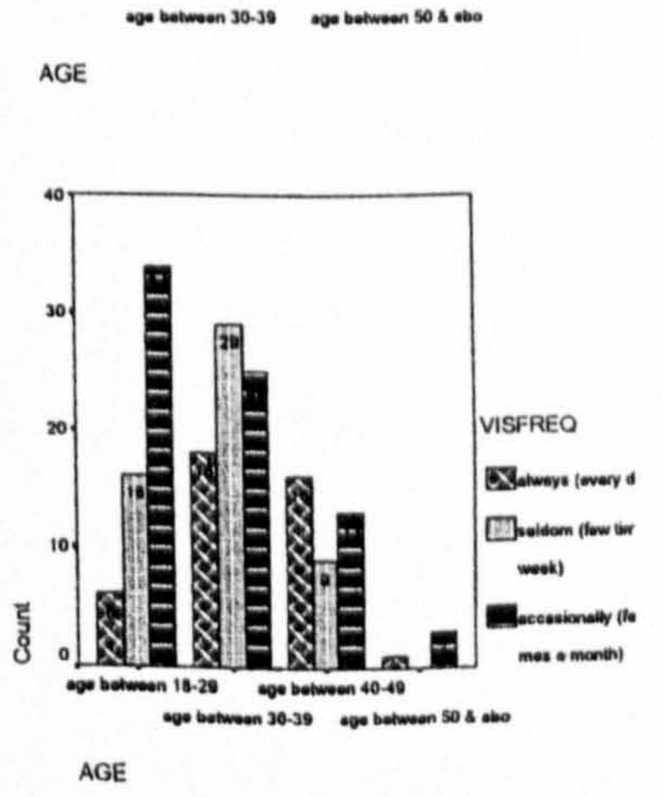


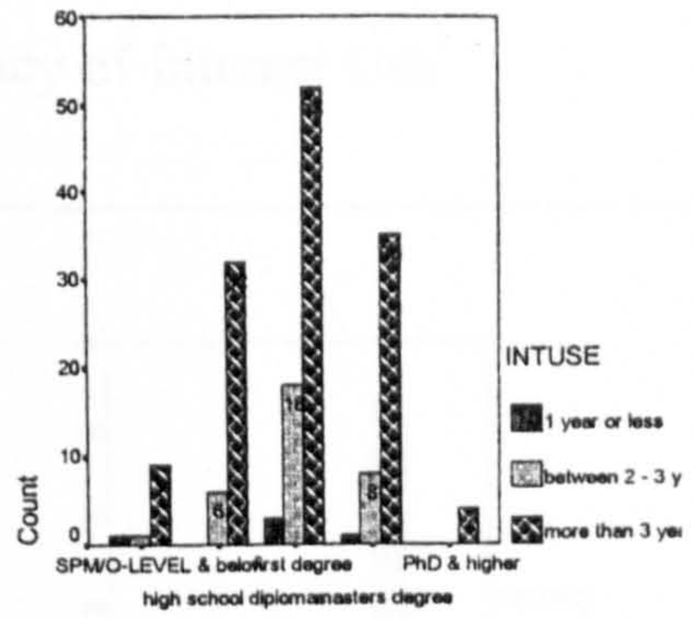
Figure 5.4 shows that the same distribution patterns occurred when comparing AGE with Length of Internet Use (INTUSE) and Frequency of Visits to Political Web Sites (VISFREQ). In all age groups, there were many respondents who were regular Internet users and had been using the Internet for more than 3 years. Nonetheless, cross-tabulation of AGE with VISFREQ presents a very interesting finding. It was found that the youngest respondents tend to visit political web sites less frequently. The data in figure 4.4 explains that 60 percent of the respondents whose age were between 18 to 29 only visited political web sites several times a month.

The table also shows that most respondents within the age group of between 30 to 39 visited political sites few times a week. For the group of between 40 to 49, most were frequent visitors of political sites. As for the oldest respondents in the age group of 50 and above, all 4 participants visited political web sites only occasionally.

Figure 5.5: Crosstabulation (Education with Length of Internet Use, Frequency of Internet Use and Frequency of Visits to Political Web Sites)

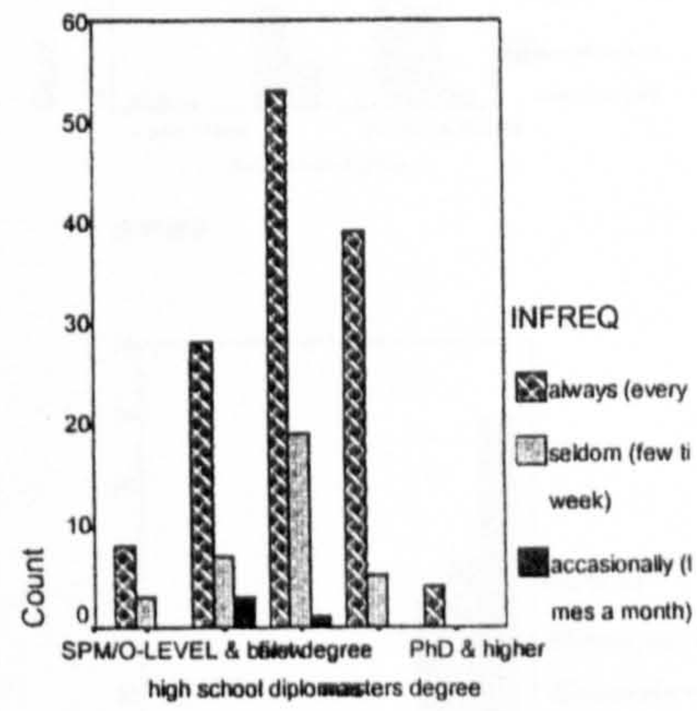
EDUC * INTUSE Crosstabulation

			INTUSE			
			1 year or less	between 2 - 3 years	more than 3 years	Total
EDUC	SPM/O-LEVEL & below	Count	1	1	9	11
		% within EDUC	9.1%	9.1%	81.8%	100.0%
		% within INTUSE	20.0%	3.0%	6.8%	6.5%
		% of Total	.6%	.6%	5.3%	6.5%
	high school diplomas & equivalent	Count		6	32	38
		% within EDUC		15.8%	84.2%	100.0%
		% within INTUSE		18.2%	24.2%	22.4%
		% of Total		3.5%	18.8%	22.4%
	first degree	Count	3	18	52	73
		% within EDUC	4.1%	24.7%	71.2%	100.0%
		% within INTUSE	60.0%	54.5%	39.4%	42.9%
		% of Total	1.8%	10.6%	30.6%	42.9%
	masters degree	Count	1	8	35	44
		% within EDUC	2.3%	18.2%	79.5%	100.0%
		% within INTUSE	20.0%	24.2%	26.5%	25.9%
		% of Total	.6%	4.7%	20.6%	25.9%
	PhD & higher	Count			4	4
		% within EDUC			100.0%	100.0%
		% within INTUSE			3.0%	2.4%
		% of Total			2.4%	2.4%
Total		Count	5	33	132	170
		% within EDUC	2.9%	19.4%	77.6%	100.0%
		% within INTUSE	100.0%	100.0%	100.0%	100.0%
		% of Total	2.9%	19.4%	77.6%	100.0%



EDUC * INFREQ Crosstabulation

			INFREQ			
			always (every day)	seldom (few times a week)	occasionally (few times a month)	Total
EDUC	SPM/O-LEVEL & below	Count	8	3		11
		% within EDUC	72.7%	27.3%		100.0%
		% within INFREQ	6.1%	8.8%		6.5%
		% of Total	4.7%	1.8%		6.5%
	high school diplomas & equivalent	Count	28	7	3	38
		% within EDUC	73.7%	18.4%	7.9%	100.0%
		% within INFREQ	21.2%	20.6%	75.0%	22.4%
		% of Total	16.5%	4.1%	1.8%	22.4%
	first degree	Count	53	19	1	73
		% within EDUC	72.6%	26.0%	1.4%	100.0%
		% within INFREQ	40.2%	55.9%	25.0%	42.9%
		% of Total	31.2%	11.2%	.6%	42.9%
	masters degree	Count	39	5		44
		% within EDUC	88.6%	11.4%		100.0%
		% within INFREQ	29.5%	14.7%		25.9%
		% of Total	22.9%	2.9%		25.9%
	PhD & higher	Count	4			4
		% within EDUC	100.0%			100.0%
		% within INFREQ	3.0%			2.4%
		% of Total	2.4%			2.4%
Total		Count	132	34	4	170
		% within EDUC	77.6%	20.0%	2.4%	100.0%
		% within INFREQ	100.0%	100.0%	100.0%	100.0%
		% of Total	77.6%	20.0%	2.4%	100.0%



EDUC * VISFREQ Crosstabulation

			VISFREQ			
			always (every day)	seldom (few times a week)	occasionally (few times a month)	Total
EDUC	SPM/O-LEVEL & below	Count	3	4	4	11
		% within EDUC	27.3%	36.4%	36.4%	100.0%
		% within VISFREQ	7.3%	7.4%	5.3%	6.5%
		% of Total	1.8%	2.4%	2.4%	6.5%
	high school diplomas & equivalent	Count	9	14	15	38
		% within EDUC	23.7%	36.8%	39.5%	100.0%
		% within VISFREQ	22.0%	25.9%	20.0%	22.4%
		% of Total	5.3%	8.2%	8.8%	22.4%
	first degree	Count	13	27	33	73
		% within EDUC	17.8%	37.0%	45.2%	100.0%
		% within VISFREQ	31.7%	50.0%	44.0%	42.9%
		% of Total	7.6%	15.9%	19.4%	42.9%
	masters degree	Count	14	8	22	44
		% within EDUC	31.8%	18.2%	50.0%	100.0%
		% within VISFREQ	34.1%	14.8%	29.3%	25.9%
		% of Total	8.2%	4.7%	12.9%	25.9%
	PhD & higher	Count	2	1	1	4
		% within EDUC	50.0%	25.0%	25.0%	100.0%
		% within VISFREQ	4.9%	1.9%	1.3%	2.4%
		% of Total	1.2%	.6%	.6%	2.4%
Total		Count	41	54	75	170
		% within EDUC	24.1%	31.8%	44.1%	100.0%
		% within VISFREQ	100.0%	100.0%	100.0%	100.0%
		% of Total	24.1%	31.8%	44.1%	100.0%

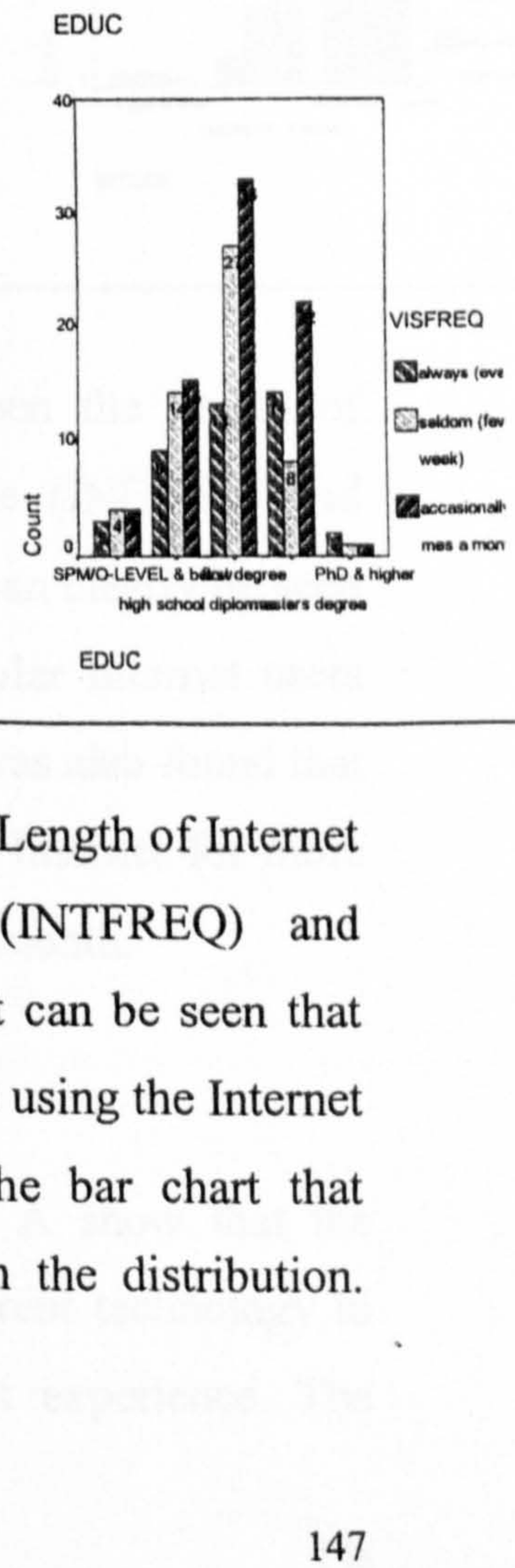


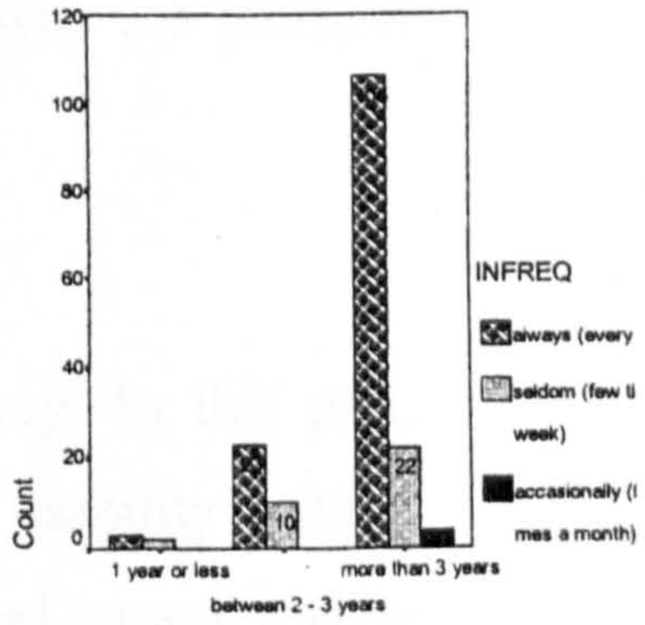
Figure 5.5 compares respondents' Education (EDUC) with Length of Internet Experience (INTUSE), Frequency of Internet Use (INTFREQ) and Frequency of Visits to Political Web Sites (VISFREQ). It can be seen that majority of the respondents in all education levels had been using the Internet for more than 3 years and were using it everyday. The bar chart that compares EDUC with VISFREQ shows some variety in the distribution.

Most respondents, whose highest education was high school diplomas, first degree and Masters degree visited political web sites only occasionally.

Figure 5.6: Crosstabulation (Length of Internet Use with Frequency of Internet Use and Frequency of Visits to Political Web Sites)

INTUSE * INFREQ Crosstabulation

			INFREQ			
			always (every day)	seldom (few times a week)	accasionally (few times a month)	Total
INTUSE	1 year or less	Count	3	2		5
		% within INTUSE	60.0%	40.0%		100.0%
		% within INFREQ	2.3%	5.9%		2.9%
		% of Total	1.8%	1.2%		2.9%
	between 2 - 3 years	Count	23	10		33
		% within INTUSE	69.7%	30.3%		100.0%
		% within INFREQ	17.4%	29.4%		19.4%
		% of Total	13.5%	5.9%		19.4%
	more than 3 years	Count	106	22	4	132
		% within INTUSE	80.3%	16.7%	3.0%	100.0%
		% within INFREQ	80.3%	64.7%	100.0%	77.6%
		% of Total	62.4%	12.9%	2.4%	77.6%
Total		Count	132	34	4	170
		% within INTUSE	77.6%	20.0%	2.4%	100.0%
		% within INFREQ	100.0%	100.0%	100.0%	100.0%
		% of Total	77.6%	20.0%	2.4%	100.0%



INTUSE * VISFREQ Crosstabulation

			VISFREQ			
			always (every day)	seldom (few times a week)	accasionally (few times a month)	Total
INTUSE	1 year or less	Count	2	2	1	5
		% within INTUSE	40.0%	40.0%	20.0%	100.0%
		% within VISFREQ	4.9%	3.7%	1.3%	2.9%
		% of Total	1.2%	1.2%	.6%	2.9%
	between 2 - 3 years	Count	5	13	15	33
		% within INTUSE	15.2%	39.4%	45.5%	100.0%
		% within VISFREQ	12.2%	24.1%	20.0%	19.4%
		% of Total	2.9%	7.6%	8.8%	19.4%
	more than 3 years	Count	34	39	59	132
		% within INTUSE	25.8%	29.5%	44.7%	100.0%
		% within VISFREQ	82.9%	72.2%	78.7%	77.6%
		% of Total	20.0%	22.9%	34.7%	77.6%
Total		Count	41	54	75	170
		% within INTUSE	24.1%	31.8%	44.1%	100.0%
		% within VISFREQ	100.0%	100.0%	100.0%	100.0%
		% of Total	24.1%	31.8%	44.1%	100.0%

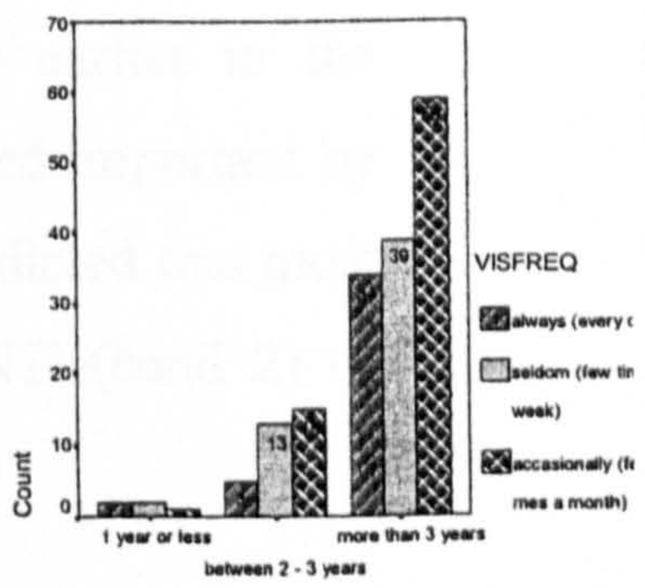


Figure 5.6 explores the data distribution patterns between the length of Internet Use (INTUSE) with Frequency of Internet Use (INFREQ) and Frequency of Visits to Political Web Sites (VISFREQ). It can clearly be seen that majority of the respondents (80.3 percent) were regular Internet users who had been using the Internet for more than 3 years. It was also found that most respondents (45.5 percent) who had been using the Internet for more than 3 years only visited political web sites several times a month.

Summary

The findings presented from the data analysis for part A show that the respondents came from different backgrounds, used different technology to access the Internet, and had different levels of Internet experience. The

respondents also differ in terms of gender, age, academic achievement, job status, and area of expertise. They used different type of computers and Internet connection to get access to the Internet. In addition, the respondents also had different Internet experience in terms of the length and frequency of use. More importantly, all respondents have had experience visiting political web sites. In view of this, the primary objective of this survey (i.e. to get respondents from different backgrounds and respondents who are political web site users) has been achieved.

5.2.2 Part B: Ratings of Web Usability Criteria

This section presents the findings on part B of the survey. In this part, respondents provided their ratings on a list of 56 web usability criteria derived from the usability criteria elicitation (Stage 1) and expert review (Stage 2). Their ratings were based on a 5 likert-scale band (band 1- very important to band 5- not at all important) as mentioned earlier in the methodology chapter. Since all the 56 criteria were considered important by the experts who participated in the expert reviews, it was predicted that most participants would rate each criteria as either 'IMPORTANT' (band 2) or 'VERY IMPORTANT" (band 1).

Statistics for Screen Appearance

Table 5.4(a): Descriptive statistics for Screen Appearance Criteria

Statistics

		S01	S02	S03	S04	S05	S06	S07	S08	S09	S10	S11	S12
N	Valid	170	170	170	170	170	170	170	170	170	170	170	170
	Missing	0	0	0	0	0	0	0	0	0	0	0	0
Mean		2.18	1.96	1.88	1.92	1.62	1.81	2.40	1.64	1.58	1.82	1.95	2.96
Median		2.00	2.00	2.00	2.00	1.00	2.00	2.00	1.00	1.00	2.00	2.00	3.00
Mode		2	2	2	2	1	2	2	1	1	2	2	3
Std. Deviation		1.08	.89	.90	.85	.85	.79	1.08	.76	.68	.85	.89	.89
Skewness		.854	1.040	1.115	1.026	1.630	.875	.405	1.133	.973	.881	1.166	-.441
Std. Error of Skewness		.186	.186	.186	.186	.186	.186	.186	.186	.186	.186	.186	.186
Minimum		1	1	1	1	1	1	1	1	1	1	1	1
Maximum		5	5	5	5	5	4	5	4	4	4	5	5

Note: refer to appendix X and table 5.4(b) for codes of all criteria

Table 5.4(a) describes the statistics for 12 web criteria for Screen Appearance. As expected, the mean, median, and mode scores for all criteria except S12 are very close to either band 1 (Very Important) and band 2 (Important). As a result, the shape of the data distribution for most of the criteria is positively skewed.

Table 5.4 (b): Ascending Mean ratings for Screen Appearance Criteria

Code	*Criteria*	*Mean*	*Closest band*
S09	Clear headings and sub headings for general text/ document	1.58	2
S05	Use of fonts that are easy to read	1.62	2
S08	Clear titles for each pages	1.64	2
S06	Different text sizes to differentiate bet. titles, headings & texts.	1.81	2
S10	Short paragraphs	1.82	2
S03	Sharp colour contrast between text and its background.	1.88	2
S04	Use of colour to differentiate functional area with content display area	1.92	2
S11	Use of typography and skimming layout	1.95	2
S02	Non excessive use of colour for text	1.96	2
S01	More space is allocated for contents than to other display elements	2.18	2
S07	Background images in the content area should be avoided	2.40	2
S12	Use the inverted pyramid writing style where you start with conclusion	2.96	3

Table 5.4(b) presents the mean scores for all criteria of Screen Appearance. The mean scores are arranged from the highest to the lowest value. The closest bands to all the means are also provided. It can be seen clearly that the respondents tend to consider all criteria as IMPORTANT (band 2) except S12. The top five criteria that received very high ratings (i.e. *S09, S05, S08, S06, and S10)* belong to sub-categories of readability and scannability. Hence, the results show that respondents regarded readability and scannability as very important to make a particular web site usable.

The criterion that was rated lowest is S12 with the mean score of 2.96 - very close to band 3 (unsure/ undecided). This indicates that many respondents were uncertain whether the criterion is important or not. Surprisingly, the criterion S7 also received low rating with the mean score of 2.40. This may suggest that many respondents believed that the background images should not necessarily be avoided. All other criteria that are not discussed here received ratings that are mostly very close to band 2 (IMPORTANT). The

frequency distribution and bar charts for all 12 criteria of Screen Appearance are presented in figure 5.7 (a) and (b).

Test of significant (ANOVA) shows that there is a significant difference between means of all different variables for Screen Appearance where $p < 0.0001$ (refer to table 5.5).

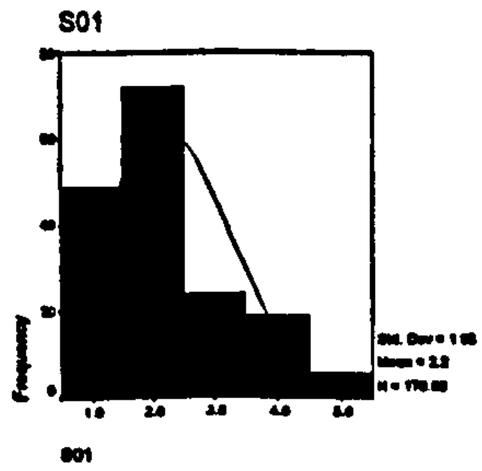
Table 5.5: Test of significant difference between means of different variables (screen appearance)

	df	ssq	msq	F
Between grps	11	280.7153	25.5196	32.7499
Within grps	2028	1,580.2687	0.7792	
Total	2039	1,860.9840		
p=0.0000				

Figure 5.7(a): Frequency distribution (with barchart) for Screen Appearance (S1 to S5)

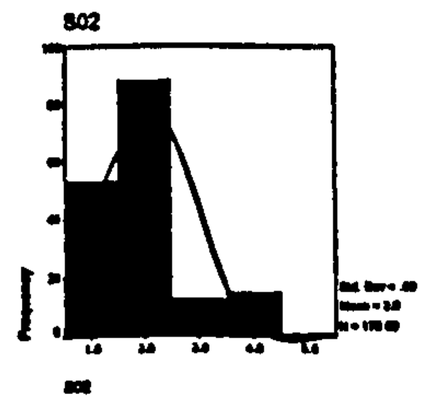
S01

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	49	28.8	28.8	28.8
	Important	72	42.4	42.4	71.2
	Undecided	24	14.1	14.1	85.3
	Not Important	19	11.2	11.2	96.5
	Not at all important	6	3.5	3.5	100.0
	Total	170	100.0	100.0	



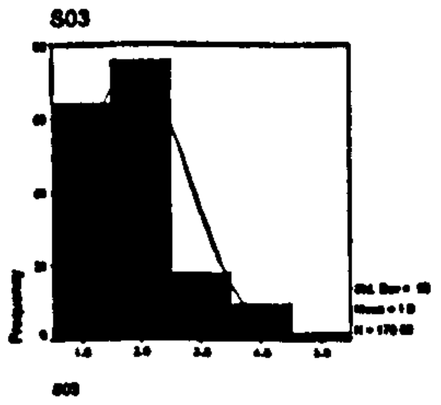
S02

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	53	31.2	31.2	31.2
	Important	88	51.8	51.8	82.9
	Undecided	13	7.6	7.6	90.6
	Not Important	15	8.8	8.8	99.4
	Not at all important	1	.6	.6	100.0
	Total	170	100.0	100.0	



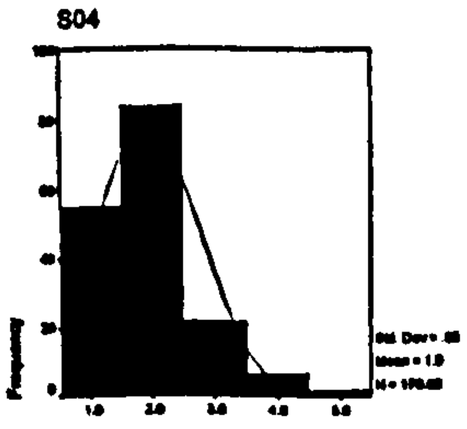
S03

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	64	37.6	37.6	37.6
	Important	76	44.7	44.7	82.4
	Undecided	18	10.6	10.6	92.9
	Not Important	10	5.9	5.9	98.8
	Not at all important	2	1.2	1.2	100.0
	Total	170	100.0	100.0	



S04

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	55	32.4	32.4	32.4
	Important	84	49.4	49.4	81.8
	Undecided	22	12.9	12.9	94.7
	Not Important	7	4.1	4.1	98.8
	Not at all important	2	1.2	1.2	100.0
	Total	170	100.0	100.0	



S05

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	93	54.7	54.7	54.7
	Important	58	34.1	34.1	88.8
	Undecided	11	6.5	6.5	95.3
	Not Important	6	3.5	3.5	98.8
	Not at all important	2	1.2	1.2	100.0
	Total	170	100.0	100.0	

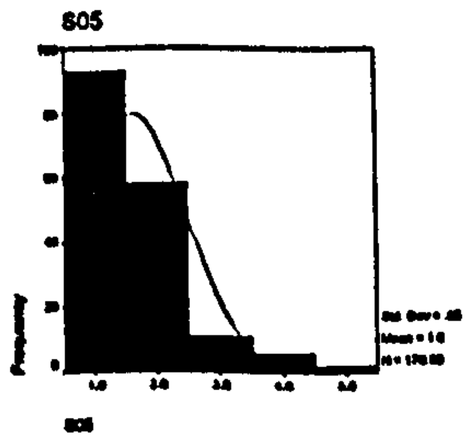
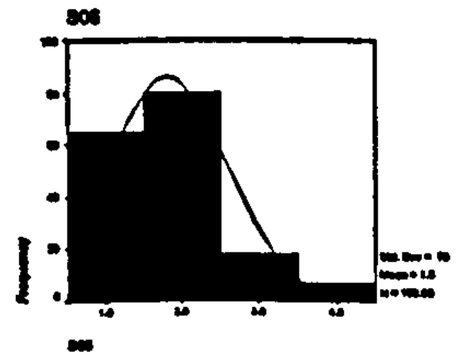


Figure 5.7(b): Frequency distribution (with barchart) for Screen Appearance (S6 to S12)

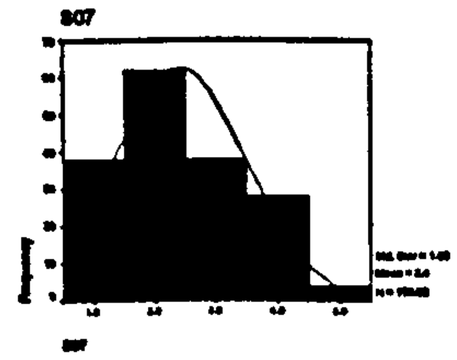
S06

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	65	38.2	38.2	38.2
	Important	80	47.1	47.1	85.3
	Undecided	18	10.6	10.6	95.9
	Not Important	7	4.1	4.1	100.0
	Total	170	100 0	100 0	



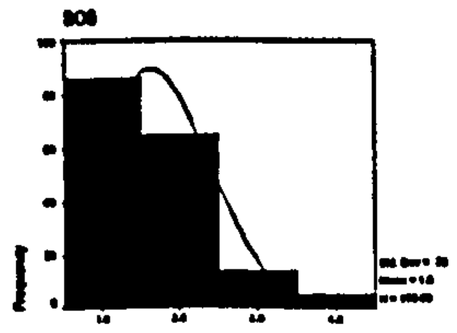
S07

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	38	22.4	22.4	22.4
	Important	62	36.5	36.5	58.8
	Undecided	38	22.4	22.4	81.2
	Not Important	28	16.5	16.5	97.6
	Not at all important	4	2.4	2.4	100.0
	Total	170	100 0	100.0	



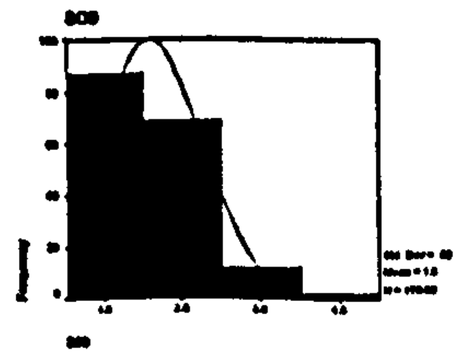
S08

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	86	50.6	50.6	50.6
	Important	65	38.2	38.2	88.8
	Undecided	14	8.2	8.2	97.1
	Not Important	5	2.9	2.9	100.0
	Total	170	100 0	100 0	



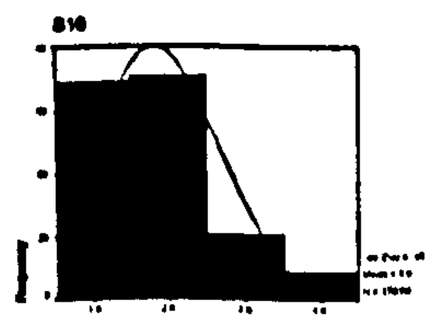
S09

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	87	51.2	51.2	51.2
	Important	69	40.6	40.6	91.8
	Undecided	12	7.1	7.1	98.8
	Not Important	2	1.2	1.2	100.0
	Total	170	100 0	100 0	



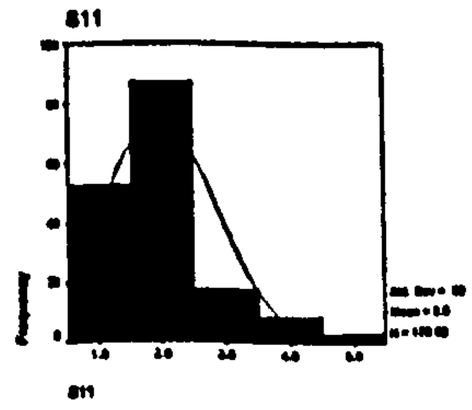
S10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	69	40.6	40 6	40.6
	Important	71	41.8	41.8	82.4
	Undecided	21	12.4	12.4	94.7
	Not Important	9	5.3	5.3	100.0
	Total	170	100 0	100 0	



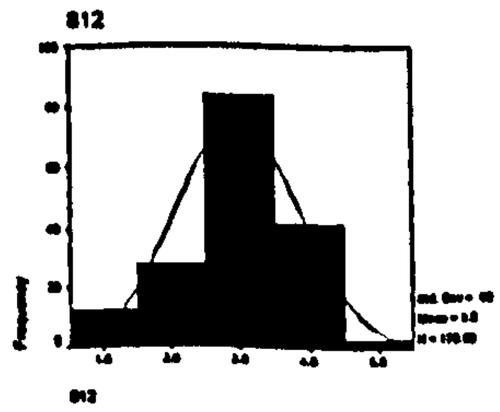
S11

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	53	31.2	31.2	31.2
	Important	87	51.2	51.2	82.4
	Undecided	18	10.6	10.6	92.9
	Not Important	9	5.3	5.3	98.2
	Not at all important	3	1.8	1.8	100.0
	Total	170	100 0	100.0	



S12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	13	7.6	7.6	7.6
	Important	28	16.5	16.5	24.1
	Undecided	84	49.4	49.4	73.5
	Not Important	42	24.7	24.7	98.2
	Not at all important	3	1.8	1.8	100.0
	Total	170	100 0	100 0	



The frequency distribution in figure 5.7(a) and 5.7(b) shows that more than 70 percent respondents rated almost all criteria for Screen Appearance as either IMPORTANT or VERY IMPORTANT. This explains why the mean scores for most of the criteria are very close to band 1 or 2. However, it should also be mentioned that a great number of respondents tend to regard some criteria as NOT IMPORTANT, for example S07 and S12. About 18 percent respondents said that S07 is either NOT IMPORTANT or NOT AT ALL IMPORTANT. Meanwhile, about 25 percent respondents considered S12 as either NOT IMPORTANT or NOT AT ALL IMPORTANT. This explains why these two criteria received very low mean score as shown in table 5.4 (b).

Statistics for Consistency criteria

Table 5.6(a): Descriptive statistics for Consistency criteria

Statistics

		T01	T02	T03
N	Valid	170	170	170
	Missing	0	0	0
Mean		2.14	2.08	2.01
Median		2.00	2.00	2.00
Mode		2	2	2
Std. Deviation		.97	1.01	.93
Skewness		.740	.946	.872
Std. Error of Skewness		.186	.186	.186
Minimum		1	1	1
Maximum		5	5	5

Note: refer to appendix X or table 5.6(b) for codes of all criteria

Table 5.6(a) presents the descriptive statistics for Consistency criteria. All 170 respondents provided their ratings for all three criteria in this category. The central tendency values of mean, median, mode for T01, T02, and T03 are all close to code 2 (Important). Hence, the shape of the data distribution is positively skewed. The frequency distributions for all these criteria are shown in figure 5.8.

Table 5.6(b): List of web usability criteria for consistency

Code	*Criteria*	*Mean*	*Closest Band*
T03	Consistent use of navigational aids	2.01	2
T02	Consistent use of text in terms of its type, font size and colour	2.08	2
T01	Consistent page layout (e.g. screen size for content display, banners, and menu bar).	2.14	2

Table 5.6(b) outlines the list of web usability criteria for Consistency. There seems to be an agreement among most of the respondents on the importance of these three criteria where all of them have mean scores of about 2.00. This result reflects respondents' opinion that there should be consistency in web sites in terms of navigational aids, use of text, and page layout. Figure 5.8 shows that more than 70 percent of the respondents rated all the 3 criteria for Consistency as either IMPORTANT or VERY IMPORTANT.

Test of significant (ANOVA) produces different results compare to other categories. It shows that there is no significant difference between means of all different variables for Consistency where $p > 0.1$ (refer to table 5.7).

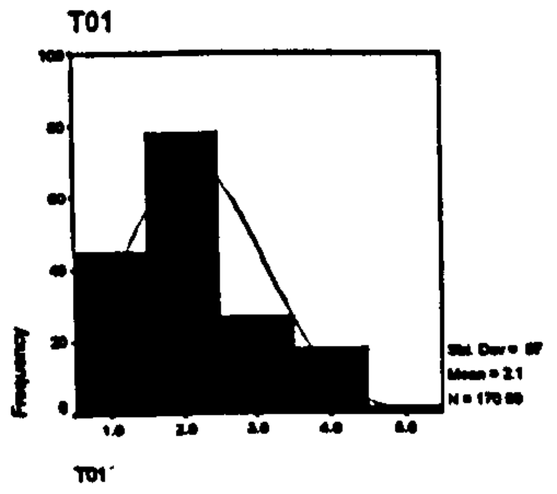
Table 5.7: Test of significant difference between means of different variables (consistency)

	df	**ssq**	**msq**	**F**
Between grps	2	1.4395	0.7197	0.7641
Within grps	507	477.5773	0.9420	
Total	509	479.0167		
p=0.4663				

Figure 5.8: Frequency distribution for Consistency criteria

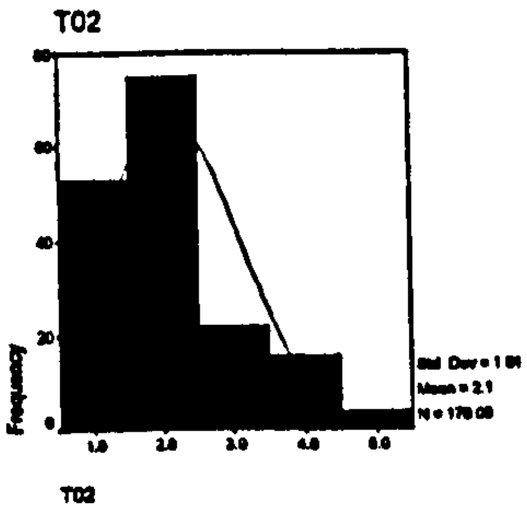
T01

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	45	26.5	26.5	26.5
	Important	78	45.9	45.9	72.4
	Undecided	27	15.9	15.9	88.2
	Not Important	18	10.6	10.6	98.8
	Not at all important	2	1.2	1.2	100.0
	Total	170	100.0	100.0	



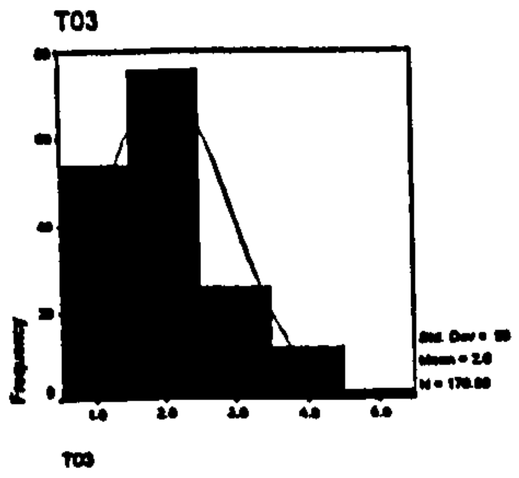
T02

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	53	31.2	31.2	31.2
	Important	75	44.1	44.1	75.3
	Undecided	22	12.9	12.9	88.2
	Not Important	16	9.4	9.4	97.6
	Not at all important	4	2.4	2.4	100.0
	Total	170	100.0	100.0	



T03

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	54	31.8	31.8	31.8
	Important	76	44.7	44.7	76.5
	Undecided	26	15.3	15.3	91.8
	Not Important	12	7.1	7.1	98.8
	Not at all important	2	1.2	1.2	100.0
	Total	170	100.0	100.0	



Statistics for Accessibility criteria

Table 5.8(a): Descriptive statistics for Accessibility Criteria

Statistics

		A01	A02	A03	A04	A05
N	Valid	170	170	170	170	170
	Missing	0	0	0	0	0
Mean		1.49	1.58	2.02	2.23	1.85
Median		1.00	1.00	2.00	2.00	2.00
Mode		1	1	1	2	2
Std. Deviation		.79	.85	1.00	.99	.80
Skewness		1.702	1.628	.714	.614	.705
Std. Error of Skewness		.186	.186	.186	.186	.186
Minimum		1	1	1	1	1
Maximum		5	5	5	5	5

Note: refer to appendix X or table 5.8(b) for codes of all criteria

Table 5.8(a) describes the statistics for 5 web criteria for Accessibility. As expected, all central tendency values (mean, median, and mode) for all criteria are very close to either band 1 (Very Important) and band 2

(Important). The shape of the data distributions also shows the same pattern (positive skewness) as to the Screen Appearance and Consistency criteria because of the concentration on the two bands.

Table 5.8(b): Ascending mean ratings for Accessibility

Code	*Criteria*	*Mean*	*Closest Band*
A01	Loading time should be acceptable to users	1.49	1
A02	Compatible contents for all main browsers	1.58	2
A05	The use of local search facility	1.85	2
A03	Compatible contents between different versions of the same browser	2.02	2
A04	Compatible display for different screen types	2.23	2

Table 5.8(b) provides the list of web usability criteria for Accessibility. Criterion A01 was rated very highly with the mean score of 1.49 that is close to band 1 (Very Important). This explains how important the loading time is to the respondents. Most respondents agreed that good web sites are those that can be accessed quickly and easily. All other criteria in this category have lower ratings that are mostly close to band 2 (Important). The frequency distribution and bar charts for all 5 criteria of Accessibility are presented in figure 5.9.

Test of significant (ANOVA) shows that there is a significant difference between means of all different variables for Accessibility where $p < 0.0001$ (refer to table 5.9).

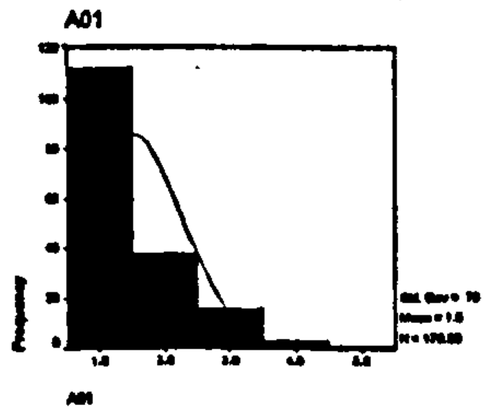
Table 5.9: Test of significant difference between means of different variables (Accessibility)

	df	**ssq**	**msq**	**F**
Between grps	4	63.6682	15.9171	20.0633
Within grps	845	670.3724	0.7933	
Total	849	734.0406		
p=0.0000				

Figure 5.9: Frequency distribution (with bar charts) for Accessibility criteria

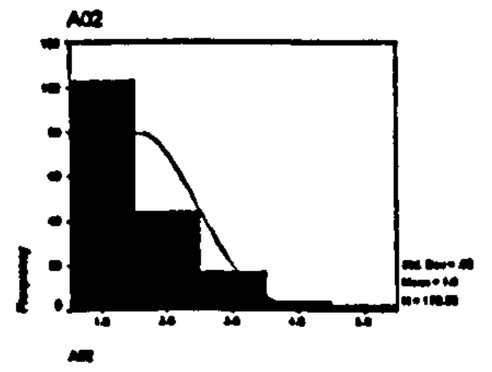
A01

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	112	65.9	65.9	65.9
	Important	38	22.4	22.4	88.2
	Undecided	16	9.4	9.4	97.6
	Not important	3	1.8	1.8	99.4
	Not at all important	1	.6	.6	100.0
	Total	170	100.0	100.0	



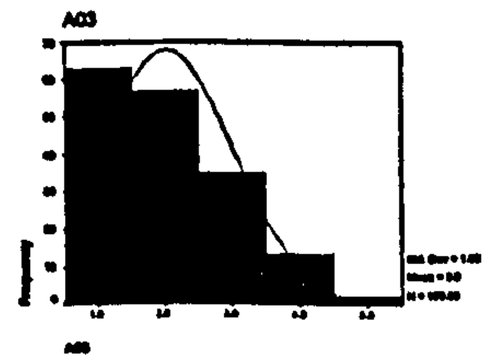
A02

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	103	60.6	60.6	60.6
	Important	44	25.9	25.9	86.5
	Undecided	17	10.0	10.0	96.5
	Not important	4	2.4	2.4	98.8
	Not at all important	2	1.2	1.2	100.0
	Total	170	100.0	100.0	



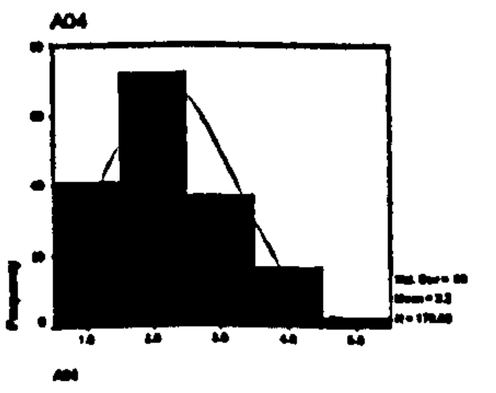
A03

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	63	37.1	37.1	37.1
	Important	57	33.5	33.5	70.6
	Undecided	35	20.6	20.6	91.2
	Not important	13	7.6	7.6	98.8
	Not at all important	2	1.2	1.2	100.0
	Total	170	100.0	100.0	



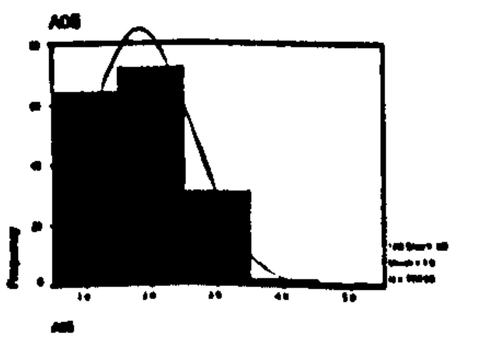
A04

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	41	24.1	24.1	24.1
	Important	72	42.4	42.4	66.5
	Undecided	37	21.8	21.8	88.2
	Not important	17	10.0	10.0	98.2
	Not at all important	3	1.8	1.8	100.0
	Total	170	100.0	100.0	



A05

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	64	37.6	37.6	37.6
	Important	72	42.4	42.4	80.0
	Undecided	31	18.2	18.2	98.2
	Not important	2	1.2	1.2	99.4
	Not at all important	1	.6	.6	100.0
	Total	170	100.0	100.0	



Criteria A01 and A02 were rated very highly by most respondents as shown in figure 5.9. More than 60 percent of the respondents rated both of these criteria as VERY IMPORTANT, and only about 2 to 3 percent rated them as NOT IMPORTANT or NOT AT ALL IMPORTANT. The only criterion that received low rating in this category is A04 mainly because about 30 percent of the respondents rated it as either UNDECIDED or NOT IMPORTANT.

Statistics for Navigation criteria

Table 5.10(a): Descriptive statistics for Navigation criteria

Statistics

		N01	N02	N03	N04	N05	N06	N07	N08
N	Valid	170	170	170	170	170	170	170	170
	Missing	0	0	0	0	0	0	0	0
Mean		1.64	1.85	1.81	1.87	2.36	1.99	1.75	2.35
Median		2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Mode		1	2	2	2	2	2	1	2
Std. Deviation		.72	.74	.86	.79	.87	.85	.81	1.05
Skewness		1.157	.600	1.288	.600	.253	.491	1.095	.395
Std. Error of Skewness		.186	.186	.186	.186	.186	.186	.186	.186
Minimum		1	1	1	1	1	1	1	1
Maximum		5	4	5	4	5	4	5	5

Note: refer to appendix X or table 5.10(b) for codes of all criteria

Table 5.10(a) outlines the descriptive statistics for Navigation criteria. All respondents provided their ratings for all 8 criteria. Once again, most of the respondents tend to rate all criteria as either 'Very Important' or 'Important'. This is because the values for central tendency (mean, median, mode) are close to band 1(very important) and band 2(important). Similarly, the shape of the data distribution is positively skewed.

Table 5.10(b): Criteria for Navigation with their Ascending Means

Code	*Criteria*	*Mean*	*Closest Band*
N01	Main menu/ key categories of contents in the main page	1.64	2
N07	Accurate/ unbroken links.	1.75	2
N03	List of key categories of contents in all sub pages	1.81	2
N02	Links to the main page in all sub pages is available	1.85	2
N04	All listed categories of contents should be meaningful to users	1.87	2
N06	Small number of steps/ links to arrive at a particular information	1.99	2
N08	Use of sitemap	2.35	2
N05	Contents should be grouped into a small number of key categories	2.36	2

Table 5.10(b) presents the criteria for Navigation category arranged by ascending means. Unlike previous categories, none of these criteria have mean ratings that are close to band 1 (Very Important). Nonetheless, most respondents still believed that all these criteria are important to make a web site usable. N1 received the highest rating with the mean score of 1.64. This means that most respondents want the main page to contain main menu. In

addition they also rated links of key categories of content in sub pages (N03) as important.

The results also show that all links within a web site should be accurate. This criterion (N07) was rated second high after N01. N05 receives the lowest rating in this category with 2.36 mean score. This indicates that the number of groupings for categories of contents is not considered very important in determining the usability of web sites. The frequency distribution and bar charts for all 8 criteria of Navigation are presented in figure 5.10 (a) and (b).

Test of significant (ANOVA) shows that there is a significant difference between means of all different variables for Interactivity where $p < 0.0001$ (refer to table 5.11).

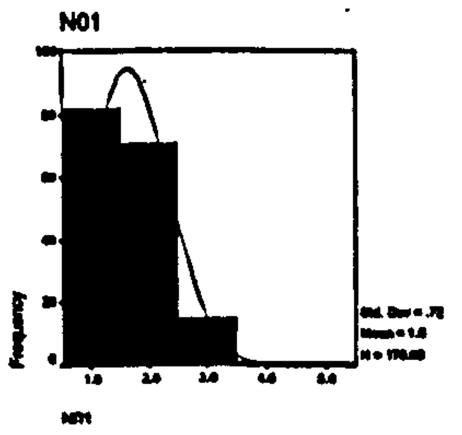
Table 5.11: Test of significant difference between means of different variables (Navigation)

	df	Ssq	msq	F
Between grps	7	85.2979	12.1854	17.1998
Within grps	1352	957.8411	0.7085	
Total	1359	1,043.1389		
'p=0.0000				

Figure 5.10(a): Frequency distribution(with barcharts) for navigation criteria (1-4)

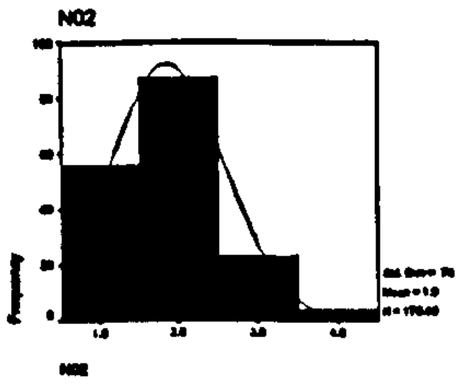
N01

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	82	48.2	48.2	48.2
	Important	71	41.8	41.8	90.0
	Undecided	15	8.8	8.8	98.8
	Not important	1	.6	.6	99.4
	Not at all important	1	.6	.6	100.0
	Total	170	100.0	100.0	



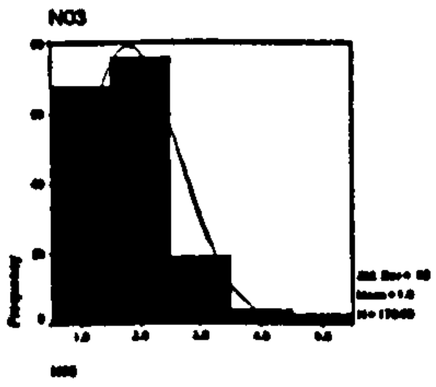
N02

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	56	32.9	32.9	32.9
	Important	87	51.2	51.2	84.1
	Undecided	23	13.5	13.5	97.6
	Not Important	4	2.4	2.4	100.0
	Total	170	100.0	100.0	



N03

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	68	40.0	40.0	40.0
	Important	76	44.7	44.7	84.7
	Undecided	19	11.2	11.2	95.9
	Not Important	4	2.4	2.4	98.2
	Not at all important	3	1.8	1.8	100.0
	Total	170	100.0	100.0	



N04

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	60	35.3	35.3	35.3
	Important	77	45.3	45.3	80.6
	Undecided	28	16.5	16.5	97.1
	Not Important	5	2.9	2.9	100.0
	Total	170	100.0	100.0	

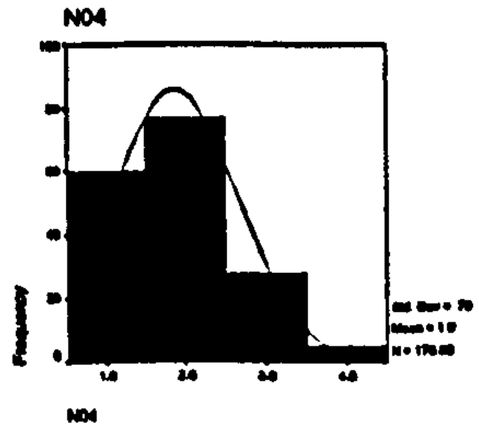
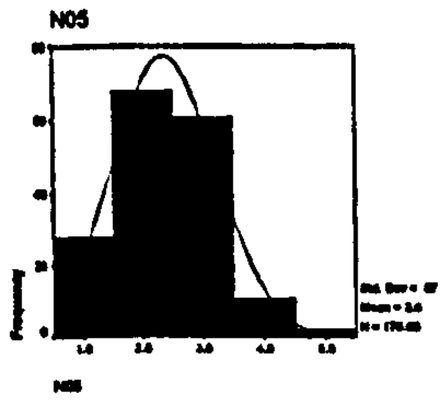


Figure 5.10(b): Frequency distribution for navigation criteria (5-8)

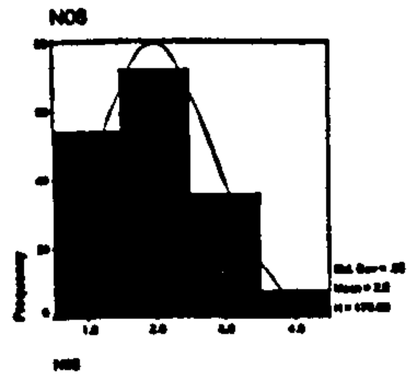
N05

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	28	16.5	16.5	16.5
	Important	68	40.0	40.0	56.5
	Undecided	61	35.9	35.9	92.4
	Not Important	11	6.5	6.5	98.8
	Not at all important	2	1.2	1.2	100.0
	Total	170	100.0	100.0	



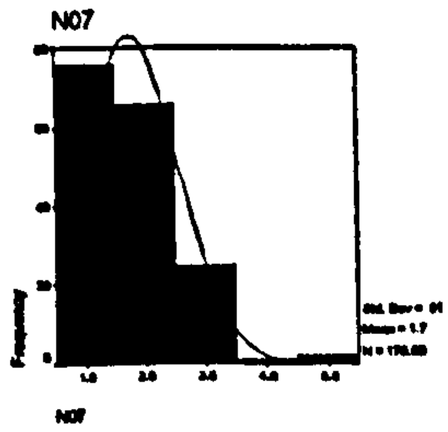
N06

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	54	31.8	31.8	31.8
	Important	72	42.4	42.4	74.1
	Undecided	36	21.2	21.2	95.3
	Not Important	8	4.7	4.7	100.0
	Total	170	100.0	100.0	



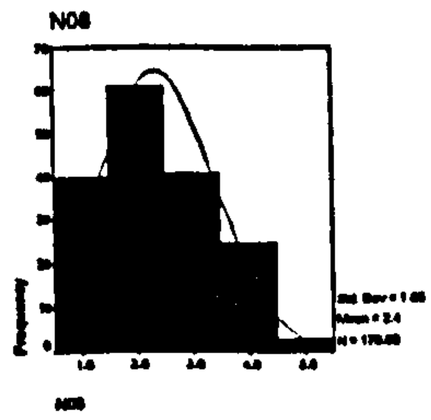
N07

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	76	44.7	44.7	44.7
	Important	66	38.8	38.8	83.5
	Undecided	25	14.7	14.7	98.2
	Not Important	1	.6	.6	98.8
	Not at all important	2	1.2	1.2	100.0
	Total	170	100 0	100 0	



N08

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	40	23.5	23.5	23.5
	Important	61	35.9	35.9	59.4
	Undecided	41	24.1	24.1	83.5
	Not Important	25	14.7	14.7	98.2
	Not at all important	3	1.8	1.8	100.0
	Total	170	100.0	100.0	



Criteria N01 and N03 as presented in figure 5.10(a) and 5.10(b) received very high ratings from the respondents. More than 80 percent of the respondents rated these two items as either IMPORTANT or VERY IMPORTANT. As a result their mean scores are very high as listed in table 5.10(b). In contrast, criteria N05, N08, and N06 received poor ratings where about 25 to 40 percent of the respondents considered them as either UNDECIDED or NOT IMPORTANT.

Statistics for Media Use criteria

Table 5.12(a): Descriptive Statistics for Media Use criteria

Statistics

		M01	M02	M03	M04	M05	M06	M07	M08
N	Valid	170	170	170	170	170	170	170	170
	Missing	0	0	0	0	0	0	0	0
Mean		2.36	2.38	1.89	1.92	2.09	2.18	2.24	2.09
Median		2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
Mode		2	2	1	2	2	2	2	2
Std. Deviation		1.03	.99	.98	.84	.90	.97	.87	.89
Skewness		.632	.671	1.176	.766	.555	.607	.531	.724
Std. Error of Skewness		.186	.186	.186	.186	.186	.186	.186	.186
Minimum		1	1	1	1	1	1	1	1
Maximum		5	5	5	5	4	5	5	5

Note: refer to appendix X or table 5.12(b) for codes of all criteria

Table 5.12(a) describes the statistics for Media Use criteria. All 170 respondents provided their ratings for all 8 criteria. Similar trend as to other categories can be seen here where most of the respondents tend to rate all criteria as either 'Very Important' or 'Important'. Nonetheless, the values for central tendency (mean, median, and mode) in this case are mostly close to band 2 (important). The shape of data distribution once again shows positive skewness because of the heavy distribution over the two codes.

Table 5.12(b): Criteria for Media Use with ascending mean scores

Code	*Criteria*	*Mean*	*Closest Band*
M03	Avoidance of looping animation to prevent users' distraction	1.89	2
M04	Control features for continuous/ time-based media	1.92	2
M08	Use of thumbnails to display photos with options for large images	2.09	2
M05	Use of static media to enhance the information being presented	2.09	2
M06	Non-excessive use of static media in all pages	2.18	2
M07	Labelling of all static media especially those used for menu or icons	2.24	2
M01	Use of continuos/ time-based media that suit context	2.36	2
M02	Alternative access to any information presented through continuos/ time-based media	2.38	2

Table 5.12(b) is a list of web usability criteria for Media Use arranged by ascending mean scores. All means for this category is close to band 2 (Important). This indicates that most of the respondents did not believe that all the criteria in Media Use are very important. However, they still thought that these criteria are important especially M03 and M04 that received the

means score of below 2.00. This suggests that designers should properly use animation clips within web pages so that they will not distract users' concentration. In addition, control features such as stop and play, should be provided for any time-based media. Surprisingly, M02 that was considered very important by the experts was not considered as such by the respondents because it received the rating with only 2.38 mean score - the lowest in this category. The frequency distributions for all Media Use criteria are listed in figure 5.11 (a) and (b).

Test of significant (ANOVA) shows that there is a significant difference between means of all different variables for Media Use where $p < 0.001$ (refer to table 5.13).

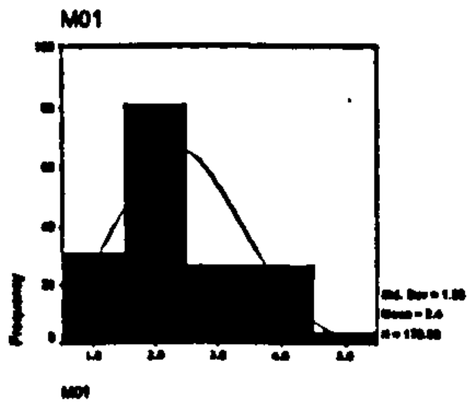
Table 5.13: Test of significant difference between means of different variables (media)

	df	Ssq	Msq	F
Between grps	7	39.6758	5.6680	6.4713
Within grps	1352	1,184.1659	0.8759	
Total	1359	1,223.8417		
p=0.0000				

Figure 5.11 (a): Frequency distribution (with barcharts) for Media Use criteria (1-4)

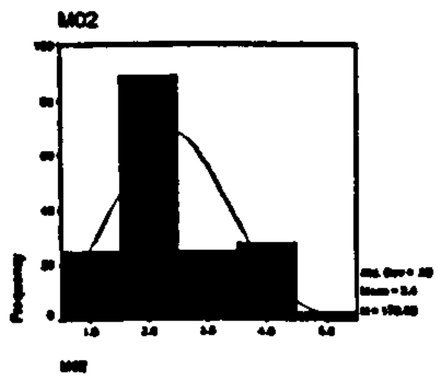
M01

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	31	18.2	18.2	18.2
	Important	81	47.6	47.6	65.9
	Undicided	27	15.9	15.9	81.8
	Not Important	27	15.9	15.9	97.6
	Not at all important	4	2.4	2.4	100.0
	Total	170	100.0	100.0	



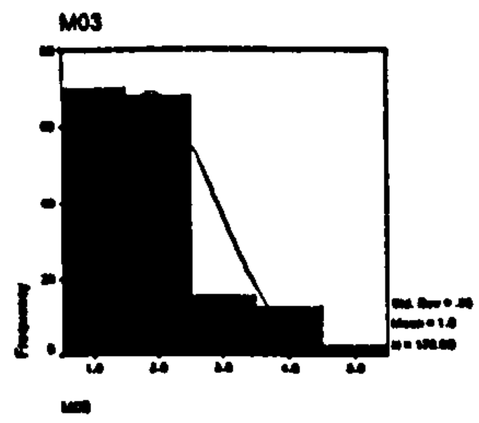
M02

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	25	14.7	14.7	14.7
	Important	89	52.4	52.4	67.1
	Undicided	25	14.7	14.7	81.8
	Not Important	28	16.5	16.5	98.2
	Not at all important	3	1.8	1.8	100.0
	Total	170	100.0	100.0	



M03

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	70	41.2	41.2	41.2
	Important	68	40.0	40.0	81.2
	Undicided	16	9.4	9.4	90.6
	Not Important	13	7.6	7.6	98.2
	Not at all important	3	1.8	1.8	100.0
	Total	170	100.0	100.0	



M04

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	58	34.1	34.1	34.1
	Important	76	44.7	44.7	78.8
	Undicided	29	17.1	17.1	95.9
	Not Important	6	3.5	3.5	99.4
	Not at all important	1	.6	.6	100.0
	Total	170	100.0	100.0	

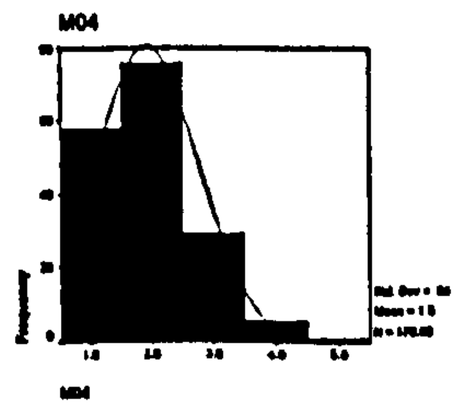
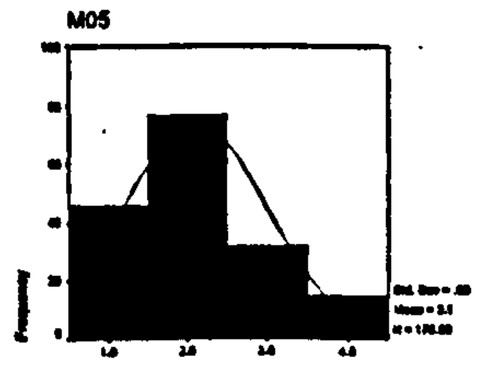


Figure 5.11(b): Frequency distribution (with barcharts) for Media Use criteria (5-8)

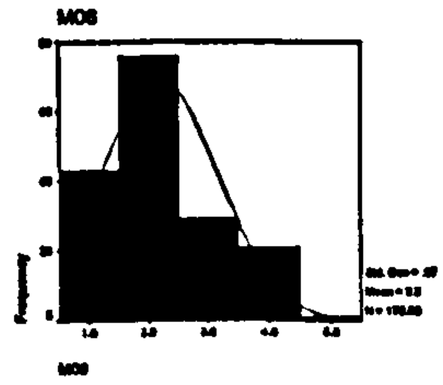
M01

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	31	18.2	18.2	18.2
	Important	81	47.6	47.6	65.9
	Undecided	27	15.9	15.9	81.8
	Not Important	27	15.9	15.9	97.6
	Not at all important	4	2.4	2.4	100.0
	Total	170	100.0	100.0	



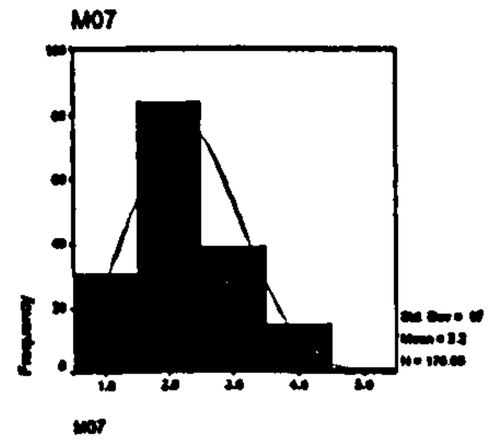
M02

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	25	14.7	14.7	14.7
	Important	89	52.4	52.4	67.1
	Undecided	25	14.7	14.7	81.8
	Not Important	28	16.5	16.5	98.2
	Not at all important	3	1.8	1.8	100.0
	Total	170	100.0	100.0	



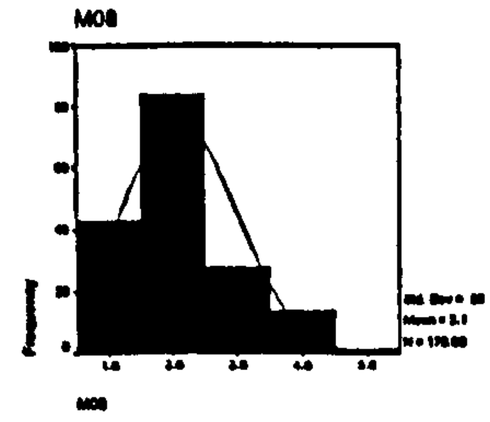
M03

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	70	41.2	41.2	41.2
	Important	68	40.0	40.0	81.2
	Undecided	16	9.4	9.4	90.6
	Not Important	13	7.6	7.6	98.2
	Not at all important	3	1.8	1.8	100.0
	Total	170	100.0	100.0	



M04

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	58	34.1	34.1	34.1
	Important	76	44.7	44.7	78.8
	Undecided	29	17.1	17.1	95.9
	Not Important	6	3.5	3.5	99.4
	Not at all important	1	.6	.6	100.0
	Total	170	100.0	100.0	



The frequency distributions in figure 5.11(a) and 5.11(b) show that criteria M03, M04, and M08 received very high ratings from the respondents. More than 70 percent of the respondents considered these items as either IMPORTANT or VERY IMPORTANT. However, respondents' perception on the importance of criteria M02, M01, and M07 vary considerably where about 30 percent of them considered the criteria as either UNDECIDED or NOT IMPORTANT.

Statistics for Interactivity criteria

Table 5.14(a): Descriptive statistics for Interactivity criteria

Statistics

		I01	I02	I03
N	Valid	170	170	170
	Missing	0	0	0
Mean		1.98	2.09	3.54
Median		2.00	2.00	4.00
Mode		2	2	4
Std. Deviation		.85	.96	1.10
Skewness		.746	.594	-.618
Std. Error of Skewness		.186	.186	.186
Minimum		1	1	1
Maximum		5	5	5

Note: refer to appendix X or table 5.14(b) for codes of all criteria

Table 5.14(a) provides the statistics for interactivity criteria. All 170 respondents also provided their ratings for all 3 criteria in this category. There is an interesting finding in this case where not all criteria were considered 'important' by the respondents. Unsurprisingly, the central tendency values of mean, median, mode for I01 and I02 are close to code 2 (Important). However, I03 received very low rating with the central tendency value of about 4.00, which is close to code 4 (Not Important). The frequency distribution for all the criteria is shown in figure 5.12.

Table 5.14(b): List of criteria for Interactivity with their ascending mean scores

Code	*Criteria*	*Mean*	*Closest Band*
I01	Availability of features for users' feedback about the site	1.98	2
I02	Availability of features for sharing views and discussions	2.09	2
I03	Availability of entertainment features	3.54	4

Table 5.14(b) provides a list of usability criteria for Interactivity with their ascending means. The means for both I01 and I02 are very close to band 2 (Important). However, I03 has very low mean score of 3.54, which is close to band 4 (Not Important). Figure 5.12 shows that about 60 percent of the respondents rated this criterion as either NOT IMPORTANT or NOT AT ALL IMPORTANT. This indicates that while admitting that users should be

given facilities for feedback and sharing views, the respondents did not think that entertainment features such as online games were important.

Test of significant (ANOVA) shows that there is a significant difference between means of all different variables for Interactivity where $p < 0.001$ (refer to 5.15).

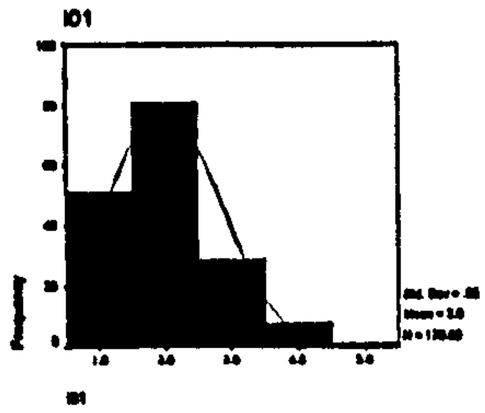
Table 5.15: Test of significant difference between means of different variables (Interactivity)

	df	ssq	Msq	F
Between grps	2	257.7312	128.8656	135.4531
Within grps	507	482.3429	0.9514	
Total	509	740.0741		
p=0.0000				

Figure 5.12: Frequency distribution for Interactivity criteria

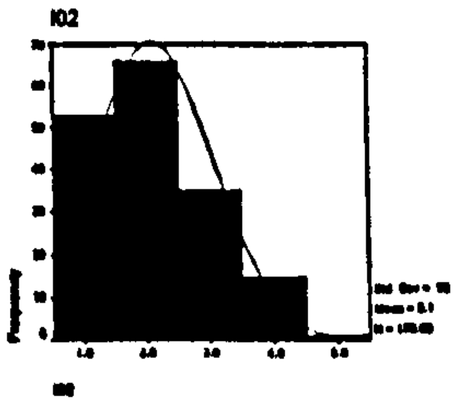
I01

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	51	30.0	30.0	30.0
	Important	81	47.6	47.6	77.6
	Undecided	29	17.1	17.1	94.7
	Not Important	8	4.7	4.7	99.4
	Not at all important	1	.6	.6	100.0
	Total	170	100.0	100 0	



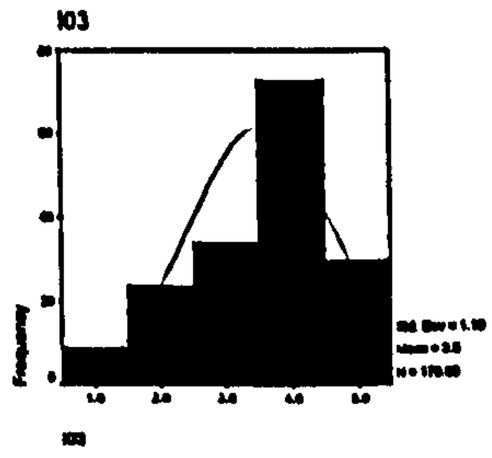
I02

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	53	31.2	31.2	31.2
	Important	66	38.8	38.8	70.0
	Undecided	35	20.6	20.6	90.6
	Not Important	15	8.8	8.8	99.4
	Not at all important	1	.6	.6	100.0
	Total	170	100.0	100.0	



I03

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	9	5.3	5.3	5.3
	Important	24	14.1	14.1	19.4
	Undecided	34	20.0	20.0	39.4
	Not Important	73	42.9	42.9	82.4
	Not at all important	30	17.6	17.6	100.0
	Total	170	100.0	100.0	



Statistics for Content criteria

Table 5.16(a): Descriptive statistics for Content criteria

Statistics

		C01	C02	C03	C04	C05	C06	C07	C08	C09	C10	C11	C12	C13	C14	C15	C16	C17
N	Valid	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170	170
	Missing	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Mean		1.56	1.65	1.44	2.00	1.64	1.77	1.59	2.06	2.00	2.19	1.41	2.03	2.22	2.48	1.94	2.38	2.25
Median		1.00	1.00	1.00	2.00	1.00	2.00	1.00	2.00	2.00	2.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Mode		1	1	1	2	1	2	1	2	1	2	1	2	2	2	2	2	2
Std. Deviation		.81	.83	.72	.91	.80	.71	.73	.96	1.01	.97	.69	.91	1.03	1.03	.85	.93	.91
Skewness		1.892	1.479	2.005	.953	1.250	.562	1.094	.615	.894	.726	1.859	.839	.739	.325	.804	.371	.446
Std. Error of Skewness		.186	.186	.186	.186	.186	.186	.186	.186	.186	.186	.186	.186	.186	.186	.186	.186	.186
Minimum		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Maximum		5	5	5	5	4	4	4	4	5	5	5	5	5	5	4	5	5

Note: refer to appendix X or table 5.16(b) for codes of all criteria

Table 5.16(a) describes the statistics for 17 web criteria for Content. As predicted, the central tendency values of mean, median, and mode for all criteria are very close to either band 1 (Very Important) or band 2 (Important). The concentration on these two bands has affected the shape of the data distribution for all criteria where all of them are positively skewed.

Table 5.16(b): Mean ratings for Content Criteria

Code	*Criteria*	*Mean*	*Closest Band*
C11	The site content should be reasonably up-to-date	1.41	1
C03	Up-to-date publication (e.g. news, articles, working paper)	1.44	1
C01	Contents covered meet the expectations of users	1.56	2
C07	Use of passages that are easy to understand	1.59	2
C05	High quality writing	1.64	2
C02	Language used is suitable for audience	1.65	2
C06	Clear distinction bet. informational and opinion content	1.77	2
C15	Information or warnings on file type and size for downloading	1.94	2
C04	Availability of an archive of previously published materials	2.00	2
C09	References or sources of articles & other text documents	2.00	2
C12	Options for output/ print format when appropriate (e.g. for long pages)	2.03	2
C08	Information on authors of articles and other text documents is provided	2.06	2
C10	Background information of the site's publisher is clearly stated	2.19	2
C13	Choices of language for multi-ethnic audience	2.22	2
C17	Links to other relevant sites	2.25	2
C16	Clear distinctions between internal and external links	2.38	2
C14	Choices of media type for a particular information	2.48	2

Table 5.16(b) provides the ascending mean scores with their closest rating bands for all content criteria. The top two criteria (C11 and C03) were being rated very highly with the mean scores of 1.41 and 1.44 respectively. Both of these values are close to band 1 (Very Important).

The result indicates that the respondents considered the recency and up-to-date contents of web sites as very important in determining the usability and content usefulness of web sites. Also received high rating was criterion C01 with 1.56 mean score, which shows that meeting users' expectations should be the priority for the web designers. C14 received the lowest rating in this category indicating that 'choices of media type for presenting information' was not considered a very important criterion by most of the participants. The frequency distribution and bar charts for all 17 criteria of Content are presented in figure 5.13 (a), (b), and (c).

Test of significant (ANOVA) shows that there is a significant difference between means of all different variables for Content where $p < 0.0001$ (refer to table 5.17).

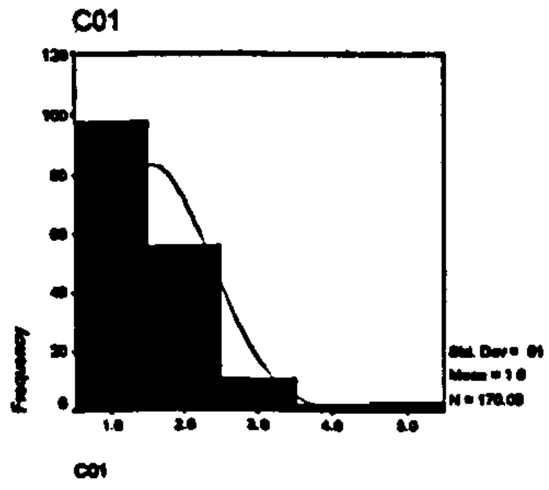
Table 5.17: Test of significant difference between means of different variables (Content)

	df	ssq	msq	F
Between grps	16	296.5898	18.5369	24.0691
Within grps	2873	2,212.6485	0.7702	
Total	2889	2,509.2383		
p=0.0000				

Figure 5.13(a): Frequency distribution (with barcharts) for Content (C1 to C5)

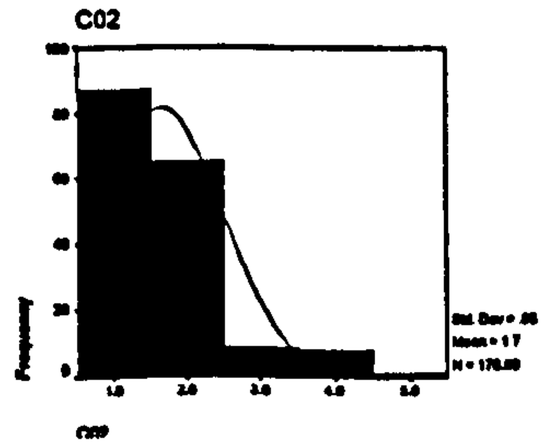
C01

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	98	57.6	57.6	57.6
	Important	56	32.9	32.9	90.6
	Undecided	11	6.5	6.5	97.1
	Not Important	2	1.2	1.2	98.2
	Not at all important	3	1.8	1.8	100.0
	Total	170	100.0	100.0	



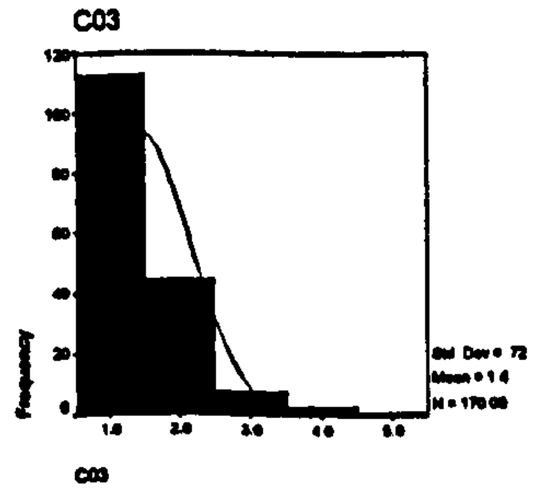
C02

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	87	51.2	51.2	51.2
	Important	65	38.2	38.2	89.4
	Undecided	9	5.3	5.3	94.7
	Not Important	8	4.7	4.7	99.4
	Not at all important	1	.6	.6	100.0
	Total	170	100.0	100.0	



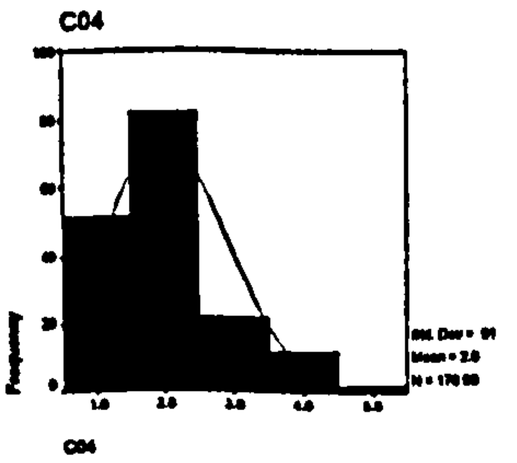
C03

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	113	66.5	66.5	66.5
	Important	45	26.5	26.5	92.9
	Undecided	8	4.7	4.7	97.6
	Not Important	3	1.8	1.8	99.4
	Not at all important	1	.6	.6	100.0
	Total	170	100.0	100.0	



C04

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	52	30.6	30.6	30.6
	Important	82	48.2	48.2	78.8
	Undecided	22	12.9	12.9	91.8
	Not Important	12	7.1	7.1	98.8
	Not at all important	2	1.2	1.2	100.0
	Total	170	100.0	100.0	



C05

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	89	52.4	52.4	52.4
	Important	61	35.9	35.9	88.2
	Undecided	13	7.6	7.6	95.9
	Not Important	7	4.1	4.1	100.0
	Total	170	100.0	100.0	

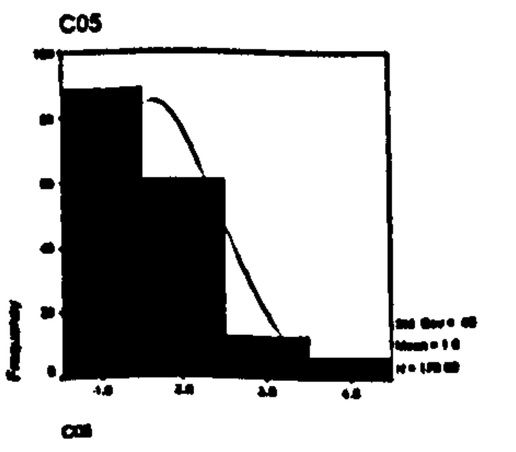
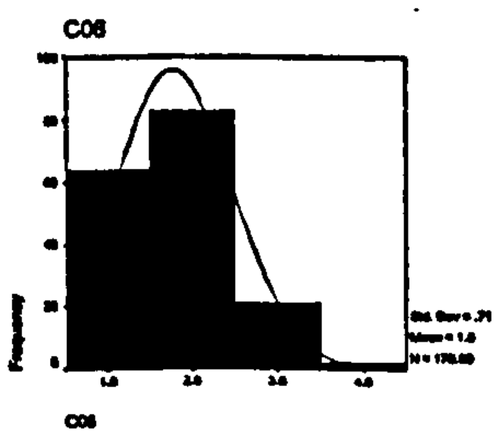


Figure 5.13(b): Frequency distribution (with barcharts) for Content (C6 to C11)

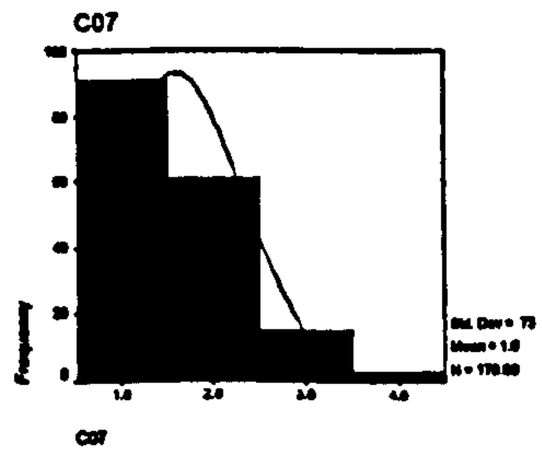
C06

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	64	37.6	37.6	37.6
	Important	83	48.8	48.8	86.5
	Undecided	21	12.4	12.4	98.8
	Not Important	2	1.2	1.2	100.0
	Total	170	100.0	100.0	



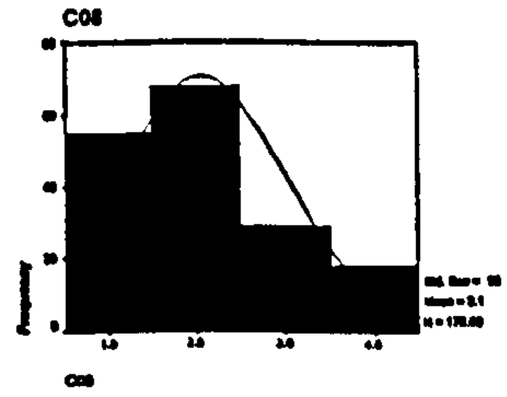
C07

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	91	53.5	53.5	53.5
	Important	61	35.9	35.9	89.4
	Undecided	15	8.8	8.8	98.2
	Not Important	3	1.8	1.8	100.0
	Total	170	100.0	100.0	



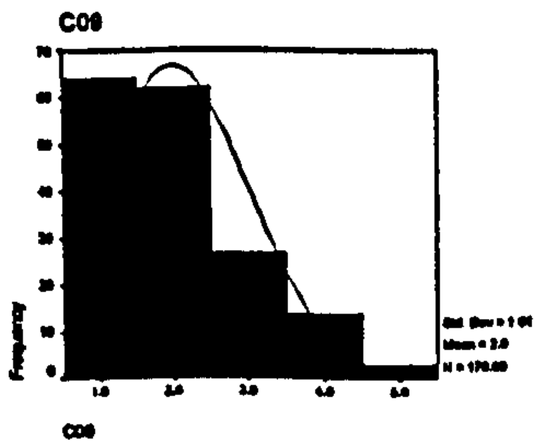
C08

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	55	32.4	32.4	32.4
	Important	68	40.0	40.0	72.4
	Undecided	29	17.1	17.1	89.4
	Not Important	18	10.6	10.6	100.0
	Total	170	100.0	100.0	



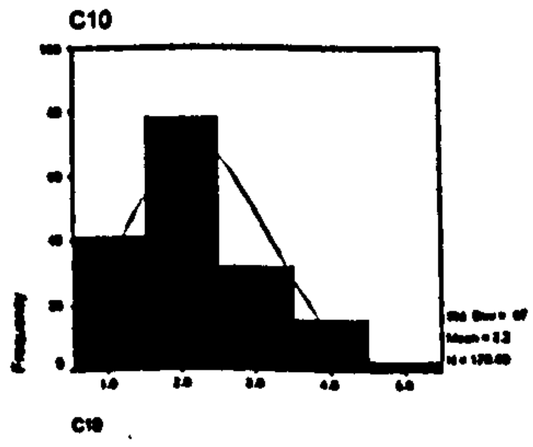
C09

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	64	37.6	37.6	37.6
	Important	62	36.5	36.5	74.1
	Undecided	27	15.9	15.9	90.0
	Not Important	14	8.2	8.2	98.2
	Not at all important	3	1.8	1.8	100.0
	Total	170	100.0	100.0	



C10

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	41	24.1	24.1	24.1
	Important	78	45.9	45.9	70.0
	Undecided	32	18.8	18.8	88.8
	Not Important	16	9.4	9.4	98.2
	Not at all important	3	1.8	1.8	100.0
	Total	170	100.0	100.0	



C11

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	118	69.4	69.4	69.4
	Important	37	21.8	21.8	91.2
	Undecided	14	8.2	8.2	99.4
	Not at all important	1	.6	.6	100.0
	Total	170	100.0	100.0	

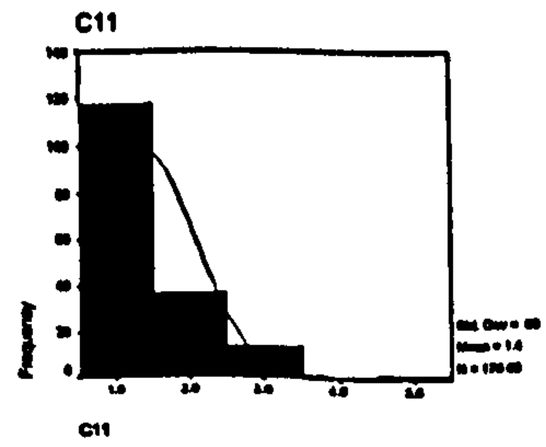
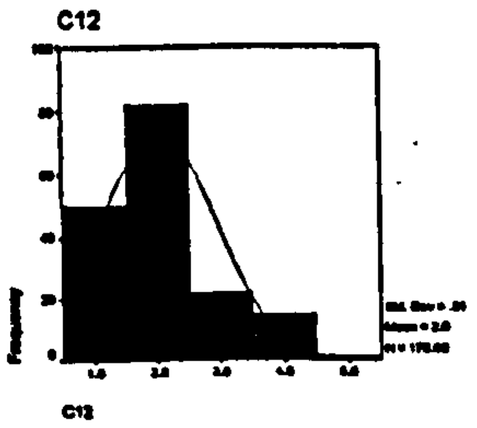


Figure 5.13(c): Frequency distribution (with barcharts) for Content (C12 to C17)

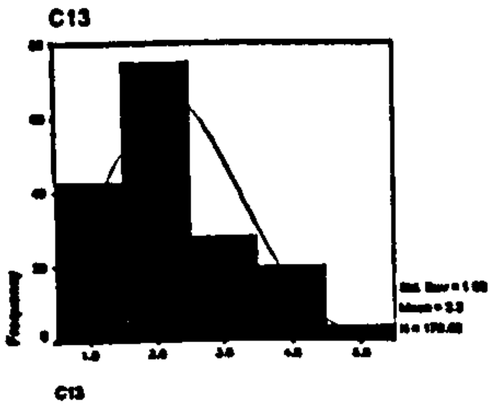
C12

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	50	29.4	29.4	29.4
	Important	82	48.2	48.2	77.6
	Undecided	22	12.9	12.9	90.6
	Not Important	15	8.8	8.8	99.4
	Not at all important	1	.6	.6	100.0
	Total	170	100.0	100.0	



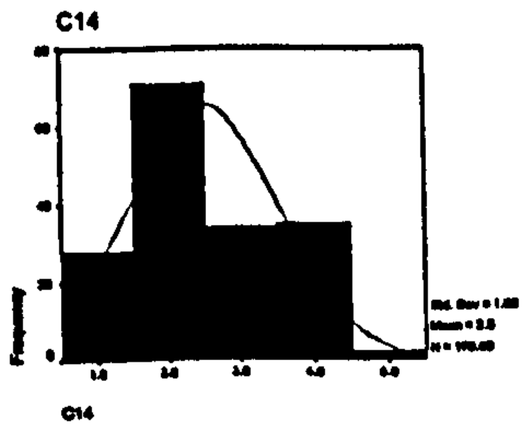
C13

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	43	25.3	25.3	25.3
	Important	75	44.1	44.1	69.4
	Undecided	28	16.5	16.5	85.9
	Not Important	20	11.8	11.8	97.6
	Not at all important	4	2.4	2.4	100.0
	Total	170	100.0	100.0	



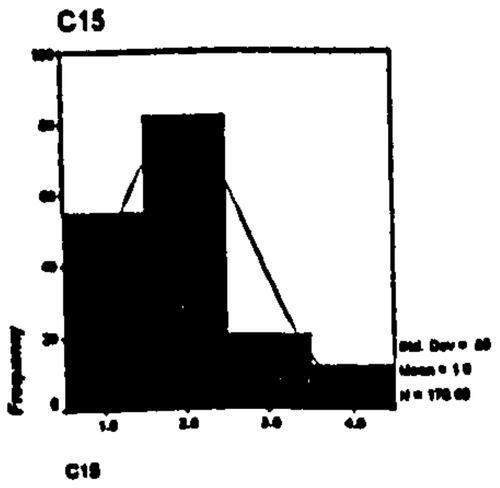
C14

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	28	16.5	16.5	16.5
	Important	71	41.8	41.8	58.2
	Undecided	34	20.0	20.0	78.2
	Not Important	35	20.6	20.6	98.8
	Not at all important	2	1.2	1.2	100.0
	Total	170	100.0	100.0	



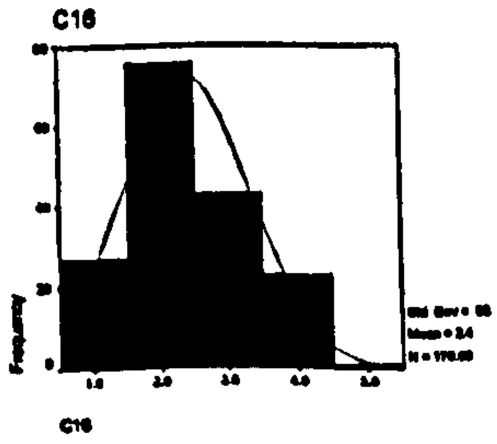
C15

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	55	32.4	32.4	32.4
	Important	82	48.2	48.2	80.6
	Undecided	21	12.4	12.4	92.9
	Not Important	12	7.1	7.1	100.0
	Total	170	100.0	100.0	



C16

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	27	15.9	15.9	15.9
	Important	76	44.7	44.7	60.6
	Undecided	43	25.3	25.3	85.9
	Not Important	23	13.5	13.5	99.4
	Not at all important	1	.6	.6	100.0
	Total	170	100.0	100.0	



C17

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	very important	35	20.6	20.6	20.6
	Important	76	44.7	44.7	65.3
	Undecided	42	24.7	24.7	90.0
	Not Important	16	9.4	9.4	99.4
	Not at all important	1	.6	.6	100.0
	Total	170	100.0	100.0	

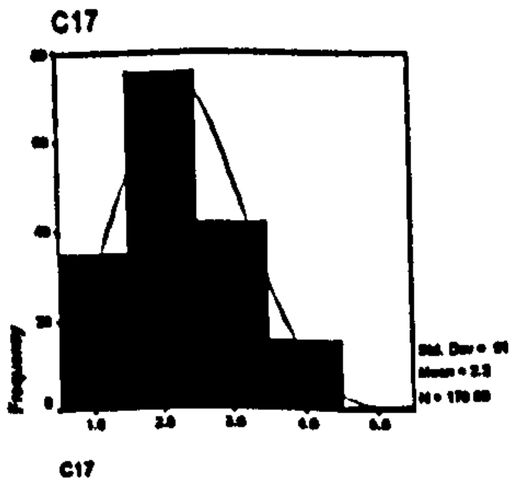


Figure 5.13(a), (b), and (c) once again show that majority of the criteria received very high ratings from the respondents. It can be noticed from the

bar graphs that most respondents rated almost all criteria as either IMPORTANT or VERY IMPORTANT. Interestingly, more than 50 percent rated 6 criteria - C11, C03, C01, C07, C05, and C02 as VERY IMPORTANT. This explains the high mean scores for the 6 criteria. Nevertheless, there are also a few criteria that were not considered important by majority of the respondents such as C14, C16, and C17. About 30 to 40 percent of the respondents rated these 3 criteria as either UNDECIDED or NOT IMPORTANT.

So far, the statistics for web usability criteria in each SCANMIC category was discussed at length. Next few pages will be a presentation of statistical analysis that deals with:

- the ratings for all criteria;
- the ratings for all SCANMIC categories, and;
- the relationship between all SCANMIC categories.

Ratings for All criteria

Table 5.18 (a): Statistics for all criteria arranged by ascending means

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
C11	170	1	5	1.41	.69
C03	170	1	5	1.44	.72
A01	170	1	5	1.49	.79
C01	170	1	5	1.56	.81
A02	170	1	5	1.58	.85
S09	170	1	4	1.58	.68
C07	170	1	4	1.59	.73
S05	170	1	5	1.62	.85
N01	170	1	5	1.64	.72
C05	170	1	4	1.64	.80
S08	170	1	4	1.64	.76
C02	170	1	5	1.65	.83
N07	170	1	5	1.75	.81
C06	170	1	4	1.77	.71
S06	170	1	4	1.81	.79
N03	170	1	5	1.81	.86
S10	170	1	4	1.82	.85
A05	170	1	5	1.85	.80
N02	170	1	4	1.85	.74
N04	170	1	4	1.87	.79
S03	170	1	5	1.88	.90
M03	170	1	5	1.89	.98
M04	170	1	5	1.92	.84
S04	170	1	5	1.92	.85
C15	170	1	4	1.94	.85
S11	170	1	5	1.95	.89
S02	170	1	5	1.96	.89
I01	170	1	5	1.98	.85
N06	170	1	4	1.99	.85
C04	170	1	5	2.00	.91
C09	170	1	5	2.00	1.01
T03	170	1	5	2.01	.93
A03	170	1	5	2.02	1.00
C12	170	1	5	2.03	.91
C08	170	1	4	2.06	.96
T02	170	1	5	2.08	1.01
I02	170	1	5	2.09	.96
M08	170	1	5	2.09	.89
M05	170	1	4	2.09	.90
T01	170	1	5	2.14	.97
S01	170	1	5	2.18	1.08
M06	170	1	5	2.18	.97
C10	170	1	5	2.19	.97
C13	170	1	5	2.22	1.03
A04	170	1	5	2.23	.99
M07	170	1	5	2.24	.87
C17	170	1	5	2.25	.91
N08	170	1	5	2.35	1.05
N05	170	1	5	2.36	.87
M01	170	1	5	2.36	1.03
C16	170	1	5	2.38	.93
M02	170	1	5	2.38	.99
S07	170	1	5	2.40	1.08
C14	170	1	5	2.48	1.03
S12	170	1	5	2.96	.89
I03	170	1	5	3.54	1.10
Valid N (listwise)	170				

Note: refer to appendix X for codes of all criteria

Table 5.18 (a) lists down all the 56 criteria based on ascending mean scores. It can clearly be seen that the top 10 spots are mostly occupied by criteria from Contents and Accessibility factors. C11 and C03 (both related to the recentness of content) receive the highest mean score with 1.41 and 1.44 respectively. This indicates that content updating is very important in determining the usability and content usefulness of web sites. Equally very important is Accessibility factor where 2 of its 3 criteria (A01 and A02) received very high mean scores. A01 (loading time is acceptable by users) occupies the third position in the list with the mean score of 1.49. This shows that respondents considered 'loading time' as one of the most important criteria for web usability. It also justifies the suggestion by the experts such as Nielsen (Nielsen, 2000) that designers should design for speed of web page access.

The lowest spot is occupied by I03 (entertainment features such as games) with the mean score of only 3.54, very close to band 4 (Not Important). The result has caused 'Interactivity' to get the lowest position compares to other factors in terms of group mean scores (refer to table 5.18 (b)). All other criteria will not be discussed here as they are explained in the next section.

Ratings for SCANMIC categories

Table 5.18 (b): The list of Web Usability factors with ascending mean scores

CATEGORY	*N*	*Mean*	*Closest Band*	*Std Deviation*
1. Accessibility	170	1.83	2	.67
2. Contents	170	1.92	2	.50
3. Navigation	170	1.95	2	.56
4. Screen Appearance	170	1.98	2	.45
5. Consistency	170	2.08	2	.87
6. Media Use	170	2.15	2	.57
7. Interactivity	170	2.54	3	.65
Valid N	170			

Table 5.18 (b) presents the mean scores for all web usability factors. Four factors received high ratings with mean scores below 2.00 where Accessibility is the highest. This indicates that accessibility is the most important factor in determining the usability of web sites. This then follows by Content, Navigation and Screen Appearance. Three other factors –

Consistency, Media Use, and Interactivity, have the mean scores of above 2.00 with Interactivity being the lowest. The findings also show that the mean scores of most factors are close to band 2 (Important) except Interactivity that has only 2.54 mean score, which is close to band 3 (undecided/ unsure).

Test of significant (ANOVA) shows that there is a significant difference between means of all different categories where $p < 0.0001$ (refer to table 5.19).

Table 5.19: Test of significant difference between means of different SCANMIC categories

	df	Ssq	msq	F
Between grps	6	54.4580	9.0763	23.4600
Within grps	1183	457.6855	0.3869	
Total	1189	512.1435		
p=0.0000				

Relationship between SCANMIC categories

The correlation between two or more variables reflects the degree to which the variables are related (Pedhazur et al., 1991). The most common measure of correlation is the Pearson Product Moment Correlation (normally called Pearson's correlation). Pearson's correlation reflects the degree of linear relationship between two or more variables where it ranges from +1 to -1 (Wright, 1997). A correlation of +1 means that there is a perfect positive linear relationship between variables. A correlation of -1 means that there is a perfect negative linear relationship between variables. However, correlations of 0, 1, or –1 are rarely found.

Table 5.20: Relationship between web usability factors

Correlations

		screen appearance	contents	accessibility	navigation	media use	interactivity	consistency
screen appearance	Pearson Correlation	1.000	.643**	.605**	.655**	.551**	.325**	.459**
	Sig. (2-tailed)	.	.000	.000	.000	.000	.000	.000
	N	170	170	170	170	170	170	170
contents	Pearson Correlation	.643**	1.000	.617**	.768**	.572**	.525**	.488**
	Sig. (2-tailed)	.000	.	.000	.000	.000	.000	.000
	N	170	170	170	170	170	170	170
accessibility	Pearson Correlation	.605**	.617**	1.000	.604**	.476**	.356**	.331**
	Sig. (2-tailed)	.000	.000	.	.000	.000	.000	.000
	N	170	170	170	170	170	170	170
navigation	Pearson Correlation	.655**	.768**	.604**	1.000	.617**	.399**	.478**
	Sig. (2-tailed)	.000	.000	.000	.	.000	.000	.000
	N	170	170	170	170	170	170	170
media use	Pearson Correlation	.551**	.572**	.476**	.617**	1.000	.467**	.272**
	Sig. (2-tailed)	.000	.000	.000	.000	.	.000	.000
	N	170	170	170	170	170	170	170
interactivity	Pearson Correlation	.325**	.525**	.356**	.399**	.467**	1.000	.129
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.	.094
	N	170	170	170	170	170	170	170
consistency	Pearson Correlation	.459**	.488**	.331**	.478**	.272**	.129	1.000
	Sig. (2-tailed)	.000	.000	.000	.000	.000	.094	.
	N	170	170	170	170	170	170	170

**. Correlation is significant at the 0.01 level (2-tailed).

Table 5.20 presents the correlation analysis of all web usability factors. In general, it can be said that these factors are inter-related between each other.

Screen Appearance has strong positive relationships with all other factors where the strongest one is Navigation. Contents and Media Use also have positive relationship with other factors where the strongest one is navigation. This implies that those who said that Screen Appearance, Content and Media Use are important would also think that navigation is important.

Correlation analysis of Accessibility, Navigation, Interactivity, and Consistency with other factors shows that they have positive relationship with all other factors where the strongest one is their relationships with Contents. This indicates that those who believed that Accessibility, Navigation, Interactivity, and Consistency are important would also believe that Contents is important.

Apart from strong relationship, the correlation analysis also shows that there is weak relationship between the usability factors. Interactivity, for example, has very weak positive relationship with consistency.

Table 5.21: Statistics of all categories by sex

Statistics of all categories by sex

SEX		screen appearance	contents	accessibility	navigation	media use	Interactivity	consistency
Female	Mean	1.9384	1.8602	1.7420	1.8279	2.0471	2.5072	2.1063
	N	69	69	69	69	69	69	69
	Std. Deviation	.4049	.4004	.5457	.4697	.5351	.6483	.9693
Male	Mean	2.0050	1.9569	1.8950	2.0371	2.2129	2.5545	2.0561
	N	101	101	101	101	101	101	101
	Std. Deviation	.4859	.5618	.7427	.5988	.5800	.6604	.7973
Total	Mean	1.9779	1.9176	1.8329	1.9522	2.1456	2.5353	2.0765
	N	170	170	170	170	170	170	170
	Std. Deviation	.4547	.5035	.6723	.5580	.5665	.6540	.8688

Table 5.21 shows comparison of mean score in all categories of web usability between male and female respondents. The results indicate that female respondents provided higher ratings than male respondents in all categories except Consistency. It was also found that Accessibility received highest rating from both male and female participants. Similarly, Interactivity was rated lowest by both genders. In short, the results imply that both male and female respondents tend to agree that Accessibility is the most important aspect of web usability whereas Interactivity is the least important one.

Table 5.22: Statistics of all categories by age

Statistics of all categories by age

AGE		screen appearance	contents	accessibility	navigation	media use	interactivity	consistency
age between 18-29	Mean	1.8914	1.7532	1.7857	1.7679	1.9085	2.2857	1.9821
	N	56	56	56	56	56	56	56
	Std. Deviation	.4153	.4163	.6357	.4649	.5104	.6111	.9501
age between 30-39	Mean	1.9769	1.9592	1.8278	2.0104	2.2431	2.6019	2.0833
	N	72	72	72	72	72	72	72
	Std. Deviation	.4868	.4904	.6632	.5858	.5707	.6068	.8064
age between 40-49	Mean	2.0570	1.9923	1.8211	2.0263	2.2270	2.7105	2.1316
	N	38	38	38	38	38	38	38
	Std. Deviation	.3822	.4805	.6490	.5184	.4649	.5961	.8473
age between 50 & above	Mean	2.4583	2.7647	2.7000	2.7813	2.9375	3.1667	2.7500
	N	4	4	4	4	4	4	4
	Std. Deviation	.7407	.9948	1.1832	.6644	.8570	1.4011	.9574
Total	Mean	1.9779	1.9176	1.8329	1.9522	2.1456	2.5353	2.0765
	N	170	170	170	170	170	170	170
	Std. Deviation	.4547	.5035	.6723	.5580	.5665	.6540	.8688

Table 5.22 compares the mean scores in all categories between different age groups. Although all age groups seem to provide consistent low ratings for Interactivity, they differ in terms of the highest ratings. Respondents in age group 30 - 39 and age group 40 - 49 tend to rate Accessibility very highly whereas respondents in age group 18 - 29 and age group '50 & above' tend to rate Contents and Screen Appearance respectively as the most important aspect of web usability.

Table 5.23: Statistics of all categories by education

Statistics of all categories by education

EDUC		screen appearance	contents	accessibility	navigation	media use	interactivity	consistency
SPM/ O-LEVEL & below	Mean	2.0682	2.1604	2.3273	2.2841	2.2955	2.5758	2.4545
	N	11	11	11	11	11	11	11
	Std. Deviation	.4899	.4866	.9435	.4713	.5428	.7614	1.0249
high sch. diploma/ equivalent	Mean	1.9846	1.9350	1.7421	1.9638	2.2467	2.5877	2.0702
	N	38	38	38	38	38	38	38
	Std. Deviation	.4114	.4057	.4941	.5295	.5219	.5048	.7985
first degree	Mean	2.0080	1.9484	1.8986	1.9726	2.1062	2.4384	2.1826
	N	73	73	73	73	73	73	73
	Std. Deviation	.4865	.5102	.6516	.5462	.5708	.6756	.8697
masters degree	Mean	1.9280	1.8102	1.7455	1.8551	2.0994	2.6364	1.8409
	N	44	44	44	44	44	44	44
	Std. Deviation	.4386	.5638	.7158	.6153	.6157	.7110	.8671
PhD & higher	Mean	1.6667	1.7059	1.1000	1.6250	2.0000	2.5833	1.7500
	N	4	4	4	4	4	4	4
	Std. Deviation	.3191	.4323	.1155	.2500	.4208	.6310	.6872
Total	Mean	1.9779	1.9176	1.8329	1.9522	2.1456	2.5353	2.0765
	N	170	170	170	170	170	170	170
	Std. Deviation	.4547	.5035	.6723	.5580	.5665	.6540	.8688

Table 5.23 provides cross-tabulation of usability factors with respondents' educational background. The results show that respondents from all education levels tend to have agreement on the fact that Interactivity is the least important aspect of web usability. They also seem to have agreement that Accessibility is the most important category except respondents in SPM/ O-Level group who choose Screen Appearance.

Table 5.24: Statistics of all categories by fields of expertise

Statistics of all categories by fields of work/ study

FIELD		screen appearance	contents	accessibility	navigation	media use	interactivity	consistency
IT & Computer Science	Mean	1.9481	1.9055	1.7508	1.9365	2.1270	2.5574	1.8907
	N	61	61	61	61	61	61	61
	Std. Deviation	.4153	.4478	.5509	.5137	.5721	.5635	.7090
engineering	Mean	1.9213	1.9771	1.7889	1.9375	2.3472	2.7407	2.0185
	N	18	18	18	18	18	18	18
	Std. Deviation	.4311	.4610	.6305	.5411	.4321	.7632	.8817
Pure Science	Mean	1.8611	1.9216	1.9000	1.9375	2.2292	2.5556	1.8333
	N	6	6	6	6	6	6	6
	Std. Deviation	.4303	.4701	.7348	.5520	.2896	.6555	.9832
Social Science	Mean	2.0733	1.9694	2.0240	1.9775	2.1425	2.4867	2.0667
	N	50	50	50	50	50	50	50
	Std. Deviation	.5580	.6481	.8606	.6501	.6439	.7831	.8137
Others	Mean	1.9429	1.8336	1.7143	1.9536	2.0643	2.4571	2.4857
	N	35	35	35	35	35	35	35
	Std. Deviation	.3659	.3856	.5320	.5295	.5332	.5428	1.0644
Total	Mean	1.9779	1.9176	1.8329	1.9522	2.1456	2.5353	2.0765
	N	170	170	170	170	170	170	170
	Std. Deviation	.4547	.5035	.6723	.5580	.5665	.6540	.8688

Comparison is also made on mean scores of all usability factors with respondents' fields of expertise as shown in table 5.24. Once again, there is a general agreement among respondents in all fields that Interactivity is the least important category. Nonetheless, a difference exists in terms of the ratings for the most important aspect of web usability (i.e. accessibility). Three field groups of IT & Computer Sciences, Engineering, and Others agree that Accessibility is the most important category, but Pure Science and Social Science groups chose Screen Appearance and Navigation respectively.

Table 5.25: Statistics of all categories by Internet Connection

Statistics of all categories by type of Internet connection

CONNECT		screen appearance	contents	accessibility	navigation	media use	interactivity	consistency
modem	Mean	1.9153	1.8735	1.8467	1.9063	2.0563	2.5167	2.0389
	N	60	60	60	60	60	60	60
	Std. Deviation	.4503	.4498	.6210	.5391	.5107	.6735	.7838
Local Area Network	Mean	2.0121	1.9417	1.8255	1.9773	2.1943	2.5455	2.0970
	N	110	110	110	110	110	110	110
	Std. Deviation	.4554	.5309	.7013	.5690	.5913	.6461	.9147
Total	Mean	1.9779	1.9176	1.8329	1.9522	2.1456	2.5353	2.0765
	N	170	170	170	170	170	170	170
	Std. Deviation	.4547	.5035	.6723	.5580	.5665	.6540	.8688

Table 5.25 produces the result of correlation between web usability factors with types of Internet connection (CONNECT). It is found that respondents

of both groups - modem or LAN users tend to agree that Accessibility is most important aspect of usability while Interactivity is the least important one.

Table 5.26: Statistics of all categories by Internet Use

Statistics of all categories by length of Internet use

INTUSE		screen appearance	contents	accessibility	navigation	media use	interactivity	consistency
1 year or less	Mean	2.0333	1.7765	1.5600	1.9000	1.7500	2.2000	2.0667
	N	5	5	5	5	5	5	5
	Std. Deviation	.2981	.4351	.8173	.5259	.4239	.6055	.6412
between 2 - 3 years	Mean	2.0328	1.9554	1.8667	1.8636	2.1326	2.5152	2.0909
	N	33	33	33	33	33	33	33
	Std. Deviation	.4521	.5592	.6551	.5799	.5912	.6406	.9177
more than 3 years	Mean	1.9621	1.9135	1.8348	1.9763	2.1638	2.5530	2.0732
	N	132	132	132	132	132	132	132
	Std. Deviation	.4614	.4937	.6743	.5554	.5629	.6601	.8691
Total	Mean	1.9779	1.9176	1.8329	1.9522	2.1456	2.5353	2.0765
	N	170	170	170	170	170	170	170
	Std. Deviation	.4547	.5035	.6723	.5580	.5665	.6540	.8688

Table 5.26 publishes the data that cross-tabulate usability factors with length of Internet use (INTUSE). Result shows that respondents with different Internet experience tend to agree that Interactivity is the least important factor. Nonetheless, respondents who have been using the Internet for 1 year or less and more than 3 years seem to say that Accessibility is the most important factors compare to those who have been using the Internet for 2 – 3 years. Respondents in this group rated navigation as the most important factor.

Summary

In general, results of the analysis in part B show that most criteria listed in the questionnaire were regarded as important in determining the usability and content usefulness of web sites by the participants. 54 out of 56 criteria were rated very highly with the mean scores of between band 1(Very Important) and band 2(Important). Nonetheless, there are also criteria that were rated less important by the respondents. This indicates that not all criteria proposed in the usability literature and the expert reviews are considered important by web users.

The results also proved that each criterion has different degree of importance from users' perspective with regards to web usability. Hence, designers and web developers should design or redesign web sites by taking into consideration usability aspects of web sites that have different level of importance. Priorities should be given to criteria that are normally considered very important by general web users to make web sites usable.

The survey also reveals that all SCANMIC factors are related to each other despite their differences in the degree of importance. Accessibility was considered the most important factor followed by Content, Navigation, Screen Appearance, Consistency, Media Use, and Interactivity. In addition, it was also found that users of different background (i.e. sex, age, education, and the Internet experience) tend to rate Accessibility as the most important factor and Interactivity as the least important factor.

5.2.3 Conclusions

The main objective of the research, which is to identify the importance of web criteria derived from usability criteria elicitation (stage 1) and expert review (stage 2) from the perspective of the Internet users with different background, was achieved. Data analysis on the participants' biography (i.e. Part A) showed that the respondents came from different backgrounds (i.e. gender, age, academic achievement, job status, and area of expertise), used different technology to access the Internet (i.e. type of computers and Internet connection), and had different levels of Internet experience (i.e. length and frequency of use). Several important points can be noted from the analysis:

- Almost 70 percent of the respondents were degree holders (first degree = 42.9 %, Masters degree = 25.9 %, PhD degree = 2.4 %). This might suggest that most Internet users who are interested in politics are highly educated.
- Almost 92.9 percent of the respondents are employed which might suggest that not many unemployed or university students are interested to visit web sites of political nature or join email lists or e-forum to discuss social and political issues.

- Although 80 percent of the respondents use high-speed computers (Pentium 2/ equivalent or higher), there are also respondents who still use lower speed computers. This suggests that web designers should also take into consideration aspects of computer speed used by the Internet users to access the Internet.
- The most popular browser among the participants is the Internet Explorer (i.e. 66.5%). However, other less popular browsers are also being used including Netscape.
- Most respondents are experienced and regular Internet users (77.6 % have been using the Internet for more than 3 years). Hence, their ratings on the importance of web usability criteria in part B of the questionnaire would be very useful.

Data analysis on web usability criteria ratings (Part B) revealed that most criteria listed in the questionnaire were regarded as important in determining the usability of web sites by the participants. The results also showed that each criterion has different degree of importance.

In terms of the SCANMIC criteria groupings, Accessibility was considered the most important group, followed by Content, Navigation, Screen Appearance, Consistency, Media Use, and Interactivity. Despite the difference in the level of importance between the groups, it was found that each group is closely related to each other except Interactivity and Consistency, which have a very weak relationship. This indicates that the usability of web sites would not be determined by a single factor.

Although the objective to get the ratings of web usability criteria was achieved, a few problems were encountered when the online survey was conducted. First, it was very time consuming to identify email groups' addresses and URLs of e-forum that are related to politics. To further complicate this, only group member is given permission to send any email to a particular email group, which means that the researcher had to join all related email groups in order to send the 'invitation to participate' email. Second, there were also some technical difficulties related to the design of the

online form particularly in terms of browser compatibility and form processing. Third, the response from the respondents was not very good for the first 2 weeks where only about 50 people replied. Follow-up invitations were sent to potential respondents to ask for more participation. Fortunately, after a period of 3 months, a total of 170 Internet users answered the questionnaire.

Stages 1 (criteria elicitation), 2 (expert review), and 3.1 (online questionnaire) only deal with generic web criteria affecting the usability of most web sites. Stages 3.2 (Interview with the Internet users), 3.3 (Interview with web developers), and 4 (web content analysis) however, were aimed at identifying web criteria that specifically affect the usability of political web sites, which will be presented in chapter 6.

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Chapter Six

The Identification of Web Usability Criteria for Political Web Sites: Interview Survey and Web Content Analysis

6.1 Introduction

The first research objective is to identify generic web usability criteria that are applicable to most web sites. This objective has been achieved as discussed in chapter 4 and 5. The second research objective is to identify generic criteria that are only applicable to political web sites (refer to figure 3.2). Three methods were utilised to achieve this as the following:

- Interview with the Internet users (Stage 3.2);

- Interview with political web developers (Stage 3.3), and;
- Content analysis of political web sites (Stage 4).

This chapter will present the data analysis and findings that involved all these three methods. The results of the interview with the Internet users will be discussed in section 6.2, the interview with political web developers in section 6.3, and finally content analysis of political web sites in section 6.4.

6.2 Interview With The Internet Users

As discussed in the methodology chapter, the goal of the interview was to obtain general views and opinion on the usability issues of political web sites. The specific objective was to identify web criteria (both generic and specific to political web sites) that affect usability and content usefulness. The following three parts with their relevant attributes were noted:

Part A: Participants' Biography

Sex, age range, education.

Part B: Internet Experience

Length of Internet use, Type of Internet applications used, Frequency of Internet use, Type of web sites visited, General reasons for visiting web sites, Reasons for visiting political web sites, and Frequency of visits to political web sites.

Part C: Usability Issues

Usability elements of good web sites, Problems faced by users while visiting web sites, Contents elements that attract users to visit and revisit web sites, and Design elements that help users find information within web sites.

Forty Internet users were selected to participate in the interview (see appendix V). The interviews took place either at the interviewees' work places or at their homes depending

on the agreement made during the invitation phase. Most of the interviews lasted about forty minutes except those who had to undergo user trials that mostly lasted for about two hours.

Comments and issues raised during the sessions were analysed in terms of priority and key findings. Comparison of feedback between each interview session was made to set aside any redundancies. Data analysis was performed using content analysis method suggested by Miles and Huberman (1994) which has been explained in the methodology chapter.

The result from part C was then compared to the SCANMIC Model derived from the literature review and the expert review.

6.2.1 Results

As mentioned earlier, the information gathered from the interview was categorised into three – Participants' biography, Internet experiences, and Web usability issues.

A: BIOGRAPHY

Table 6.1: Participants by gender, age group, and education

Sex	No.	%
Male	26	65
Female	14	35
Total	40	100
Age range		
Below 20	4	10
20-30	20	50
31-40	13	32.5
Above 40	3	7.5
Total	40	100
Education		
High school diplomas/ lower	21	52.5
1st degree	13	32.5
Masters degree	5	12.5
PhD	1	2.5
Total	40	100

A total of forty people participated in this survey where 65 percent were male and 35 percent were female. Their ages range from below 20 up to above 40 as shown in table 4.9. 50 percent of the participants fall within the age group of 20 to 30, 32.5 percent within the age group of 31 to 40, while the remaining belongs to either the age group of below 20 and above 40. From this data, it can be said that participants in this survey differ in terms of gender as well as ages.

A diverse educational background was also noted (refer to table 6.1). About half of the participants hold at least high school diplomas or lower, 32.5 percent hold bachelors degree in various fields, 12.5 percent are Masters degree graduates, and the remaining 2.5 percent (1 participant) has a PhD.

B: GENERAL INFORMATION

Most of the participants are experienced Internet users. Table 6.2 shows that 75 percent of the participants have been using the Internet for more than three years. In addition, more than half of the participants (55%) use the Internet daily. From this, it can be assumed that majority of the participants were expert and regular users of the Internet.

Table 6.2: Participants by Internet experience (length of use, usage frequency)

Length of use	No.	%
Less or 1 year	1	2.5
1-3 years	19	22.5
More than 3 years	30	75
Internet usage Frequency		
Daily	22	55
Several times/week	14	35
Several times/month	4	10

It was also identified that the Internet applications such as e-mails, WWW, chatting, and file transferring or downloading were very popular among the interviewees (refer to

table 6.3). Emails and WWW were the top two applications that are being used by all participants.

Table 6.3: Participants by Internet applications Used

Internet applications	No.	%
Email	40	32.3
WWW	40	32.3
Chatting	23	16.5
File transfer/ download	20	16.1
Conferencing	1	0.8

Note: one participant might use more than 1 application

The participants were also asked about their general purposes for visiting web sites. As expected, there were various answers to this including those listed in table 6.4.

Table 6.4: Participants by general purposes for visiting web sites

Purposes for web visits	No. of users
1. Read news	26
2. Search information for projects/ work needs	17
3. Download files	11
4. As a hobby	4
5. Personal interest (e.g. making friends)	3

Since most of the participants were interested in politics, as predicted most chose 'read news' as the main purpose for visiting web sites. Apart from that, they also visited web sites for information-specific searching purposes, downloading files, and personal interests. Also interesting is the fact that few of the participants use the Internet as a hobby.

Since there are many types of web sites, participants were also asked the type of sites they normally visited. The reason behinds this was to identify whether the participants were using only certain type of web sites or depended on their needs. As expected, participants normally visited more than one type of web sites depending on the information they were looking for. The results for this are summarised in table 6.5.

Table 6.5: Participants by type of Web sites visited

Type	No.
1. Education	22
2. News	22
3. Politics	13
4. Entertainment	6
5. Kiosk/ Portal	4
6. E-Commerce/ Banking	2
7.Government	2
8. Sports	2
9. Personal sites	2
10. Edutainment	1

Note: one participant might visit more than 1 type of web sites

As explained earlier in the methodology chapter, the target population for this interview survey were the Internet users in Malaysia specifically those who were interested in politics. All participants have had experience and are familiar with political web sites in Malaysia. The only difference was in terms of the frequency of visits and the number of political web sites they visited. Eleven out the forty participants visited political web sites only several times every month (refer table 6.7); hence they underwent user-trials to get them familiar with political web site environment.

All participants also provided information on why they were visiting political web sites. This question was important because it reflected their goals when visiting political sites. There are at least eight reasons for this as outlined in table 6.6. The main reason given by a substantial number of the participants is to follow current political development in Malaysia. This indicates that most political web sites that provide news should ensure that the news they provide are updated regularly to attract regular visitors. Additionally, participants preferred to read fair news and reflect the perspective of both the ruling and opposition parties.

Some participants visited political web sites to get reliable information and news that were not available in the traditional print media. Some information and news especially related to the opposition parties and pressure groups are not available in the main media

because of the restrictions from the government. That is why some participants turned to the Internet to find such information.

Apart from local politics, some participants visited web sites to find information about political development of other countries. This kind of information is hardly found in local print media. There were also views among the interviewees that they turned to the Internet to get news release faster and cheaper. Faster in the sense that they can read the news as soon as it is published even in the middle of the night, cheaper because they only pay for the Internet access. One participant who was a university student visited political web sites for educational purposes.

Table 6.6: Participants by reasons of political web site visits

Follow current political development	16
Read news coverage on politics from the perspective of both government and opposition parties	9
To get reliable political news not available in traditional media	6
To get up-to-date political news not available in traditional media	6
To know opposition's views on current issues	4
Read political news faster and cheaper	3
For educational purposes (e.g. essays)	1
To be conscious of political issues internally and internationally	1

Table 6.7: Participants by frequency of visits to political web sites

Visit frequency	*No.*	*%*
Daily	14	35
Several times/ week	15	37.5
Several Times/ month	11	27.5

C: USABILITY ISSUES

This is the most important part of the survey. It intended to reveal users' opinion on the usability issues of web sites particularly those related to political web sites. There were four major questions in this part. First, users were asked to list down usability elements normally found in good web sites. The word 'good' in this case refers to a web site that is easy to use and access, and useful in terms of contents. Second, users were questioned

on the problems they faced while visiting web sites. Third, users were requested to provide content elements of web sites that attract them to revisit the sites. Finally, the participants were questioned on the design elements that help them find information easily within a web site.

Usability Elements of Good Web Sites

In general, the participants believed that good web sites are those that are easy to access, easy to use, and informative. Unsurprisingly, all elements given by the participants are very common in the usability literature and were already included in the SCANMIC model. Nonetheless, there are two additional criteria that are worth mentioning - users should feel welcome and web site trustworthiness.

Two participants proposed that a web site be designed in such a way that users would feel welcome, invited, and attracted the moment they enter its main page. This would motivate them to explore the web site more. Elements such as sexually explicit banners, racial sentiments, and satanic symbols are examples that would drive users away from web sites. Another suggestion was trustworthiness. This refers to the contents that are reliable and accurate, and can be trusted. The list of generic web criteria of good web sites along with the frequency of each criteria mentioned by the participants are presented below.

Generic criteria of good web sites

1. Fast loading especially main page = 5
2. Good screen structure = 4
3. Simple layout = 3
4. Unbroken links = 2
5. Feel welcome = 2
6. The way information is presented = 2
7. User-friendly = 2
8. Free downloadable files (inc. Audio and video) = 1
9. Bulleted points, not paragraph = 1
10. Users comments = 1
11. Proper groupings of contents = 1
12. Informative = 1
13. Links to other related topics = 1

14. Less advertisement = 1
15. Trustworthiness = 1
16. Local search facility = 1

Apart from the generic criteria, the participants also proposed the criteria that are specific to political web sites. Most participants were looking for reliable information that was fairly reported and comprehensively covered. Some of the interviewees turned to the Internet to look for information that was not covered in the traditional print media especially those that represented voices of opposition parties. There were also participants who were not in favour of the materials that included slandering and attack on certain individuals particularly public leaders. The complete list of criteria for good political web sites together with the frequency of each criterion mentioned by the participants is shown below.

Specific criteria of good Political Web Sites

1. Reliable content that reflects the truth = 11
2. Regularly updated especially news = 9
3. Unbias content = 5
4. News not covered in traditional news media = 3
5. No slandering/ attacks on individuals = 3
6. Pictorial news = 2
7. Good authors/ writers = 1
8. E-forum = 1
9. Fact-based news = 1
10. Explain certain issues in detail = 1
11. Provide views from both opposition and ruling party = 1

Problems Faced By Users When Visiting Web Sites

There were different kinds of problems faced by the participants while accessing and browsing the web sites. It was found that participants were facing with at least twenty-eight major problems- twenty-three are considered problems related to general web sites, while the remaining five are specific to political web sites. The problems are listed below together with the frequency of each problem mentioned by the participants.

Generic problems faced by web site visitors

1. Long loading =18
2. Broken links = 16
3. Network connection problem = 14
4. Too many banners = 8
5. Poor choice of colour = 6
6. Pop-up windows = 6
7. Lost within the site = 4
8. Long scrolling = 4
9. Too much animated graphics = 3
10. Irrelevant graphics = 3
11. Too many menus = 3
12. Cramped/ crowded pages = 2
13. Unstructured pages = 2
14. Site structure non-conformance to standards = 2
15. No warning for external links = 1
16. Poor navigation = 1
17. Too much advertisement than facts = 1
18. Too structured = 1
19. Unattractive = 1
20. Get plug-in message = 1
21. Outdated content = 1
22. Under construction pages = 1
23. Change of address/ URL = 1

Long page loading was considered by eighteen participants as one of the major problems faced while accessing web sites. This problem normally occurred due to other related factors such as too many banners, long pages, too much animated graphics, and crowded pages. Besides these problems, participants also expressed concerns over web sites that have pop-up windows, long scrolling, too many menus, and get plug-in message. Also worth mentioning is the network connection problem faced by the participants especially those who get connection through modems.

The participants also highlighted a few problems that are specific to political web sites (see the list below including the frequency of each problem mentioned by the participants). Some of them proposed web sites to diversify issues reported in the news and other publication. In addition, all information provided should be reliable, accurate, and reflects the facts.

Problems faced by visitor of Political Web Sites

1. Cover the same issue all the time = 6
2. Too much 'rubbish' news = 2
3. Inaccurate news headings = 1
4. Too much campaign than motivational facts = 1

Content Elements That Attract Users To Visit A Web Site Regularly

Besides design elements, content elements were also seen by the participants as very important that could contribute towards web usability. A total of seventeen generic criteria and thirty specific criteria were put forward by the interviewees. Most of the generic elements are associated with interactive elements (user feedback, chatting, and readers' comments), links to related web sites, give-aways (e-card, free e-mail) and information quality (simple language, short paragraph). All of these together with the frequency of each elements mentioned by the participants, are presented below.

Generic content elements of Web Sites

1. Variety of information medium used= 6
2. Name of author=2
3. Links to related contents=4
4. Proper grouping of contents=3
5. Links to established web sites=2
6. Background music that can be controlled=5
7. More interactive (user response & feedback)=5
8. Relevant graphics (static/ animated)=5
9. Feedback from users that are replied by web masters=1
10. Simple language=1
11. Humour=1
12. Chatting=1
13. E-card=1
14. Free email=1
15. Readers' comments=1
16. Short paragraph=1
17. Choice of language=1

Thirty content elements suggested by the participants are related specifically to political web sites (see the list below together with the frequency of each elements mentioned by the participants). Most of them concern with recency, quality, variability, and reliability of information, interactive features, and news archiving.

Content elements of Political Web Sites

1. up to date contents especially news=15
2. summary of news/ articles with links to full versions=10
3. news with pictures=10
4. accurate news headers=9
5. news coverage of various issues=7
6. provide non political contents as well=7
7. accurate title for news/ stories/ information =7
8. reliable information=6
9. divide news according to scope (e.g. local & international=5)
10. attractive headings = 4
11. news not available in conventional media=4
12. dialogue/ QA with politicians/ public figures=3
13. news arranged to recency=2
14. good writing style=2
15. links to political news on neighbouring countries=2
16. religious corner (e.g. reminder, surmons)=2
17. commentary section on hot issues=2
18. entertainment features (e.g. games)=2
19. short summary of articles = 2
20. separation between past & latest news=1
21. no slandering=1
22. fair reporting=2
23. list of activities/ programs=1
24. forum=1
25. sources of news/ articles=1
26. polling on certain issues=1
27. history of country=1
28. history of parties =1
29. start article with conclusion=1
30. archive of previous news release=1

Web Design Elements That Help Users Find Information Easily

Participants also provided their views on web design elements, which could help them find information easily within a site. After analysis, a total of twenty criteria were identified (refer to the list below together with the frequency of each element mentioned by the participants). Since most of these criteria are generic and applicable to all type of web sites, they will be discussed later (section 6.2.2) when they are compared with the SCANMIC model.

Generic web design elements

1. proper choice of colour = 13
2. list of key categories of contents = 8
3. proper groupings of contents = 8
4. standard navigation (menu location, buttons etc.) = 7
5. archive searching (news, articles etc) = 5
6. less scrolling = 5
7. conservative colour (not too bright) = 4
8. simple layout = 3
9. local search facility = 3
10. graphic menus with text labels = 3
11. accurate links = 3
12. change appearance occasionally but not too drastic = 2
13. text links within text so that users can explore if they wanted to know more=2
14. chunk information = 2
15. scanning features (italic, bold etc) = 2
16. well structured screen = 1
17. no scrolling = 1
18. site map menu on every page = 1
19. proper choice of words for categories = 1
20. proper font size for text = 1
21. information on files to be downloaded = 1
22. provide thumbnails for photos = 1
23. design consistency = 1
24. design for speed = 1
25. news with links to other related news = 1
26. menus fit on screen (no menu scrolling) = 1
27. less instruction = 1

6.2.2 Findings And The SCANMIC Model

The results of the interview survey were compared with the SCANMIC model derived from the usability criteria elicitation (stage 1) and expert review (stage 2) as discussed in chapter four. The aim was to identify whether the recommendations from the experts in usability areas were justified. In addition, there might be other important criteria that have been left out during the expert review that are considered important from the users' point of view.

Design elements

Screen Appearance/ Visual Layout

From table 6.8, it can be seen that the participants also recommended three out of twelve criteria for Screen Appearance listed in the SCANMIC model. Interestingly,

some of the criteria proposed by the participants were not suitable for any of the categories in the SCANMIC model. Hence, a new category called 'layout' was created to accommodate these new criteria.

Table 6.8: List of criteria for Screen Appearance

Choice of Colour • Non excessive use of colour for text* • Sharp colour contrast between text and its background* • Use of colour to differentiate functional area (e.g. tool bar, menu bar and list of contents) with content display area* • Conservative colour (not too bright)*** *Readability* • Use of fonts that are easy to read (e.g. Ariel, Times New Roman, & Verdana)* • Different text sizes to differentiate between titles, headings and texts** • Background images in the content area should be avoided* *Scannability* • Clear titles for each pages* • Clear headings, sub headings for general text/ document** • Short paragraphs (use short sentences and limit a paragraph to only one idea)* • Use the inverted pyramid writing style where you start with conclusion* • Use of typography and skimming layout (e.g. bold fonts and highlighted words)** *Layout***** • Simple layout*** • Well structured*** • More space is allocated for contents (about 80%) and the remaining to other display elements (e.g. menu bar, list of contents, and advertisement)*
* = proposed in the SCANMIC model but not by users ** = proposed by both users and the SCANMIC model *** = proposed by users but not the SCANMIC model **** = new sub group created to accommodate new criteria

Accessibility

There were two main criteria proposed by the participants that were also suggested in the SCANMIC model - 'acceptable loading time' and 'the use of local search facility' (refer to table 4.5). This justifies the SCANMIC model that designers should design for speed and provide local search engine for quick searching.

Table 6.9: List of web criteria for Accessibility

Loading Speed ▪ Loading time to all pages within a web site should be acceptable (normally between 10 – 20 seconds depending on the contents of the page)** *Display Compatibility* ▪ Compatible contents for all main browsers (e.g. Netscape and Microsoft Explorer)* ▪ Compatible contents between different versions of the same browser * ▪ Compatible display for different screen type (e.g. black and white, palm top and digital television)* *Fast Content Retrieval* ▪ The use of local search (especially for medium and large web site/ a site with more than 500 pages) that can help users find information quickly and easily**
* = proposed in the SCANMIC model but not by users ** = proposed by both users and the SCANMIC model

Navigation

Five criteria suggested by the participants were listed in the SCANMIC model (refer to table 6.10). The participants' view on the need for main menu of content, meaningful wording for each category, accurate links, and the use of sitemap were already proposed in the SCAMIC Model. However, there were four criteria that were not mentioned in the model (i.e. the use of standard navigation aids, less scrolling, text links within text, and menu is fit on screen), hence they were included in the list as new criteria.

Table 6.10: List of web criteria for Navigation

▪ Main menu/ list of key categories of contents in the main page is provided** ▪ Links to the main page in all sub pages are available* ▪ List of key categories of contents in all sub pages so that users do not have to go back to the main page to browse other pages* ▪ All listed categories of contents should be meaningful to users** ▪ Contents should be grouped into a small number of key categories (between 5-7 [or 7 plus minus 2] is recommended)* ▪ Small number of steps/ links to arrive at a particular information (rule of thumb is 3)* ▪ All links are accurate or unbroken** ▪ Use of sitemap** ▪ Use standard navigation aids*** ▪ Less scrolling*** ▪ Text links within text so that users can explore if they wanted to know more*** ▪ Menus are fit on the screen (no menu scrolling)***
* = proposed in the SCANMIC model but not by users ** = proposed by both users and the SCANMIC model *** = proposed by users but not the SCANMIC model

Media Use

Some of the expert views in the SCANMIC model were supported by the participants' opinion. Three out of eight criteria for media use proposed in the model as shown in table 6.11 were also considered important by the interviewees. They believed that control features should be provided for information presented in continuous media, static media is used only to enhance information being presented, and finally, thumbnails are provided for displaying photos.

Table 6.11: List of web criteria for media use

Continuous media (audio, animation and video) ▪ Use of continuos/ time-based media to suit context (e.g. demonstration, instruction, speeches, and songs).* ▪ Alternative access to any information presented through continuos/ time-based media (e.g. text version)* ▪ Avoidance of looping animation to prevent users' distraction.* ▪ Control features for continuous/ time-based media (e.g. to turn off and replay)** *Static media (Graphics and Images)* ▪ Use of static media to enhance the information being presented** ▪ Non-excessive use of static media in all pages* ▪ Labelling of all static media especially those used for menus or icons* ▪ Use of thumbnails to display photos with the option of viewing larger images.**
* = proposed in the SCANMIC model but not by users ** = proposed by both users and the SCANMIC model

Interactivity

Besides the experts, it was found that both criteria for 'interactivity' as listed in table 6.12, were also considered important by the participants. This indicates that web designers should integrate interactive web elements such as on-line feedback and e-forum to attract more visitors.

Table 6.12: List of web criteria for Interactivity

▪ Availability of features for users' feedback about the site (e.g. web master's email address and on-line form).** ▪ Availability of features for sharing views and discussions (e.g. e-forum and net discussion).** ▪ Availability of entertainment features (e.g. online games, puzzles)
* = proposed in the SCANMIC model but not by users ** = proposed by both users and the SCANMIC model

Consistency

Initially, there were three criteria for Consistency listed in the SCANMIC model. Two of them were also proposed during the interview (refer to table 6.13). However, a new criterion was added after some participants stated that sometimes, minor changes to the web page appearance are required to maintain users' interests.

Table 6.13: List of web criteria for Consistency

▪ Consistent page layout (e.g. screen size for content display, banners, and menu bar)**
▪ Consistent use of text in terms of its type, font size and colour.*
▪ Consistent use of navigational aids (e.g. menu bar, buttons and links in terms of graphics metaphor, size and colour).**
▪ If changes is necessary, do not do it drastically***
* = proposed in the SCANMIC model but not by users ** = proposed by both users and the SCANMIC model *** = proposed by users but not the SCANMIC model

Contents elements

Originally, content elements were divided into five sub groups (i.e. scope/ coverage, accuracy, authority, currency, uniqueness, and linkages). A new sub-group was then added - text quality.

Scope/ Coverage

Table 6.14 outlines a total of seventeen criteria for scope/ coverage that combine the criteria from both the SCANMIC model and the participants. Out of the seventeen elements, only three were proposed in the SCANMIC model. Others were new criteria derived from the interview survey.

Table 6.14: Content elements related to scope/ coverage

▪ News coverage of various issues***
▪ Reliable information***
▪ News not available in conventional media***
▪ Proper grouping of contents***
▪ Dialogue/ QA with politicians/ public figures***
▪ Religious corner (e.g. reminder, sermons)***
▪ Archive of previous news release**
▪ History (e.g. Parties, organisations)***
▪ Commentary section on hot issues***
▪ Polling on certain issues***
▪ Forum***
▪ Humour***
▪ Chatting***
▪ List of activities/ programs***
▪ Readers' comments***
▪ Suitable language for audience*
▪ Contents meet users' expectation*
* = proposed in the SCANMIC model but not by users ** = proposed by both users and the SCANMIC model *** = proposed by users but not the SCANMIC model

Accuracy

Most criteria for accuracy as listed in table 6.15 were only proposed in the SCANMIC model except one - 'any graphics used should be relevant to the content or purpose of the site', which was identified during the interview survey.

Authority

Unlike accuracy, the participants in the interview survey also mentioned two out of the three SCANMIC criteria for authority. This indicates that information on authors and sources of information were considered important in determining the content authority.

Currency

Both the experts and the users seemed to agree on the fact that content provided in web sites should be updated regularly (refer to table 6.15).

Uniqueness

Six criteria for content uniqueness are listed in table 6.15. Three were new criteria derived from the analysis of the interview, two were criteria suggested by both the experts in the SCANMIC model and the participants in the survey, and one was proposed by the experts but not by the participants.

Table 6.15: Content elements for Accuracy, Authority, Currency and Uniqueness

Accuracy
▪ High quality writing (e.g. good grammar & no typo error)* ▪ Use of passages that are easy to understand* ▪ Clear distinction between informational and opinion content*
Authority
▪ Name of author** ▪ Sources of news/ articles** ▪ Background information of the site publisher/ owner*
Currency
▪ Up to date contents especially news** ▪ News arranged to recency***
Uniqueness
▪ Variety of media for displaying information (e.g. text only, audio only, and video)** ▪ Provide non political contents as well*** ▪ Background music that can be controlled*** ▪ Give-aways (e.g. e-card, free emails, free e-group membership)*** ▪ Choice of language for multiethnic audience** ▪ Information/ warnings on file type/ size for downloading*
Note: * = proposed in the SCANMIC model but not by users ** = proposed by both users and the SCANMIC model *** = proposed by users but not the SCANMIC model

Text Quality

This is a new category created to accommodate a few criteria proposed by the participants (refer to table 6.16). All these criteria relate to how information should be presented to users effectively, for example, by adding pictures in news or articles, summarising news or articles with options for full versions, and organising news or articles according to scope and date of publication. Also proposed were the criteria that

could enhance the quality of information presentation such as good writing style, fair reporting, use of simple language, and attractive but accurate headings.

Table 6.16: Contents elements for text quality

▪ News with pictures ▪ Summary of news/ articles with links to full versions ▪ Accurate title for news/ stories/ information ▪ Divide news according to scope (e.g. local & international) ▪ Attractive headings ▪ Fair reporting ▪ Good writing style ▪ Simple language ▪ No slandering
Note: This is a new category created after analysis of the interview survey. All criteria in this category are not proposed in the SCANMIC model

Linkages

Two new criteria were added to this category as shown in table 6.17, which suggest that web designers should provide both internal and external links to ensure that users could get as much information as they could by visiting web sites. If certain related information is not available in one web site, users should be guided through the use of external links to help them find that information somewhere else.

Table 6.17: Content elements for Linkages

▪ Links to related contents** ▪ Links to established web sites*** ▪ Links to political news on neighbouring countries*** ▪ Clear distinctions between internal and external links*
Note: * = proposed in the SCANMIC model but not by users ** = proposed by both users and the SCANMIC model *** = proposed by users but not the SCANMIC model

6.2.3 Summary

In general, it can be said that the survey was a success in the sense that it had achieved its main objectives in identifying generic usability criteria including those that are specific to political web sites. Although only forty people participated, they come from

different background in terms of gender, age and education. Furthermore, they also had different level of Internet experience and technology used to access the Internet. Most of web criteria proposed by the participants indicated that they generally preferred web sites which are easy to access, easy to use, and informative.

The findings have also justified the experts' view on the importance of some criteria proposed in the SCANMIC model. A few new criteria were also identified, allowing further refinement of the SCANMIC model. Besides the generic criteria, the survey also revealed some criteria that are specific to political web sites. Most of these criteria as discussed earlier are related to content coverage of political web sites.

6.3 Interview With Political Web Site Developers

Apart from getting the information from the Internet users, the interview survey with political web site developers in Malaysia was also conducted. The goal was to identify views and opinion of political web developers with regards to the web usability issues particularly pertaining to their strategies for publishing usable and useful web sites.

As stated in the methodology chapter, the main objectives were:

- to know the general purposes of political web sites;
- to identify developers' strategies to achieve the purposes;
- to identify whether they have achieved their objectives;
- to identify general problems they faced in developing and maintaining their web sites, and;
- to get their overall views on web elements that affect usability.

Ten major political web site developers in Malaysia were invited to participate in this survey and five agreed to contribute (refer to Appendix VII). Four of the participants were representatives from four major political parties - UMNO (the ruling Party), PAS (the Islamic Party), MCA (the Chinese Party), and DAP (the Democratic Party). One

participant works for Non-Governmental Organisation called ABIM (the Islamic Youth Organisation).

All interviews were carried out at the participants' work places with an average time of about 60 to 75 minutes per interview session. Besides tape recording device, a special form was used to note key points during each interview. All five completed forms were analysed comprehensively, after which the results were summarised and transferred into a new form for further analysis (refer to appendix IX).

6.3.1 Findings

The goal of political web site

Almost all participants provided the same feedback on the goals of their sites that is to distribute their party/ organisations' messages to their members and general public. However, MCA has additional goal that is not only to convey political information, but also to explore new means for disseminating information.

The main objectives of political web site

In general, the objectives of most political web sites are:

- To convey messages directly to members and public without restrictions;
- To explain/answer national issues with regards to their party/ organisations' stands;
- To promote good relationship between visitors and party/politicians;
- To get feedback from people about their party/organisation;
- To disseminate press release/ news so that people get first hand news directly;
- To announce activities to the public and members;
- To disseminate information that is rarely found in the traditional print media;
- To become a reference centre for political information, and;
- To provide news update daily to supplement conventional newspaper.

Strategies

There are various strategies used by the participating web site developers to achieve their objectives. The most common one is to do promotions on their web sites through several ways including:

- submitting URLs to popular search engines;
- distributing leaflets and stickers;
- providing advertisements in newspapers and letterheads, and;
- announcement in public lecture and talk.

Some of the participants also believed that regular updating of their web sites' content especially news or press release is a good strategy that could attract visitors. There were also views that providing give-aways such as free email, contests, and free e-group membership is another good strategy. One participant insisted that it is also important to get the recognition from the top party leadership to ensure the success of a web site.

Achievements

The survey shows that none of the participants knew how to measure the success or achievements of their web sites since being published. The only indicators used for measuring success were through the number of hits and users' feedback. Some participants said that they had not yet achieved their objectives because the number of visitors was below expectations. There was also suggestion by a participant that the achievements of his organisation's web site are difficult to be assessed because of lack of users' feedback. Nonetheless, all participants agreed that the content should be improved, web server ought to be upgraded to support more visitors, and funding for maintaining the web sites should be increased.

Financial support

All participants admitted that maintaining web sites are very costly especially when daily updating is involved. They all said that the fund they received for web projects were inadequate. To date, all participating web developers receive funding from their

own party/ organisation except PAS that gets the financial support from donations from private firms and individuals.

Manpower

All participating parties and organisation did not have enough manpower to maintain or redesign web sites. Most have only between three to four employees assigned to the Information Technology unit that develops and maintains web sites. One party even has only one full-time staff in charged of its web site.

Web Development and Maintenance Problems

The problems faced by all participants with regard to web development and maintenance were almost similar. First is the difficulty in performing regular updating of the contents due to lack of sources from their leadership. They argued that the top political leaders are very busy and difficult to be contacted. In addition, there is insufficient manpower to do the very challenging and time consuming updating task. Also, the computer facilities were inadequate and outdated. Another problem was due to lack of knowledge in web design that makes it difficult for developers to produce web sites that are highly usable and competitive.

Web Development timeframe

To develop a usable and useful web site, one has to follow proper steps such as planning, designing, testing, publishing and maintaining (Nielsen, 2000). Unfortunately, all web developers that participated in this survey did not follow proper steps when developing their web sites. Mostly they created web sites with no clear idea on how to design and present information in such a way that their objectives were met. All participants developed web sites within a very short period of time of between one week to three months. No participant performed usability testing or expert evaluation on his web sites before being launched. This indicates that most of them published web sites for the sake of publishing without taking into consideration factors such as usability, usefulness, and competitiveness.

Usability testing

Any good web sites would undergo usability testing or evaluation so that any usability problems faced by the visitors can be identified (Powell, 2000). In this survey, it was found that most web site developers did not perform usability testing to their sites except one who only performed it internally. When asked about 'usability testing', one participant did not even know what it means despite his position as a webmaster. This shows that some developers are lack of knowledge on the importance of usability testing that could improve the usefulness of a web site.

The Use of Web Design Guides or Reference

Participants were also asked whether they used web design guidelines or reference during web site development. There were different answers to this. Two participants said they used several guides and texts books. One participant said his team did not use any guidelines but were given some help by the professionals. Another participant explained that his party paid outside company to design their web site. Surprisingly, there was one participant who did not use any design guide or help from the professionals.

Feedback from visitors

Some usability experts propose web designers to provide facilities for user feedback so that they can give comments on the design and content aspects of their sites (Nielsen, 2000; Keeker, 2000). In relation to this, participants were asked whether they received any feedback from visitors and what did they do with feedback if they received it. All participants provided the same answer by saying that they in fact most of the time receive feedback from some visitors with good and bad comments. Most visitors were asking for more interactivity within web sites such as e-forum, chatting, e-card, and e-voting. There was also suggestion by the visitors to provide faster version of their web sites with less graphics and animations. Some feedback was taken into consideration by the developers when their web sites were redesigned.

Future plan

The participants were also questioned about their future plans with the web sites. Interestingly, most responded with the same answer by stating that they planned to provide better site that conveys information more effectively. At the same time they also aimed at providing more features to attract more visitors. These can be achieved by putting more contents such as discussion forum, shopping mall, Internet polls, internal search engines, online registration, and real time events.

6.3.2 Findings and the SCANMIC Model

Despite the fact that none of the participating web developers run usability testing or proper evaluation on their sites, all were aware of the importance of web usability issues. Most of the issues raised by the participants are already listed in the SCANMIC Model.

There are three main areas that were brought up by the participants namely content, accessibility, and interactivity. Most developers regarded content as one of the major factors that attract many visitors. Hence, they highlighted the need for regular content updating, content diversity, give-aways (such as free emails, contests, and free e-group members), shopping mall, and real time events (such as conferences and public lecture). Almost all these content elements were also proposed either by the experts in the literature review or the users in the interview survey except shopping mall (refer to table 6.14 - 6.16).

The web developers were also in total agreement with both the Internet users and the experts who participated in this research on the issue of speed of web delivery (refer to table 6.9). All participants were aware on the need to provide web content that can be accessed quickly by the users. Hence, web servers should be upgraded and, graphics and animation reduced within their web sites in order to speed up users' access rate.

Another usability aspect identified during the interview was elements of interactivity within web pages. Like the experts and the Internet users, most developers agreed that political web sites should be interactive particularly in giving users options to send feedback and participate in online discussion (refer to table 6.12). One developer mentioned about his party's plan to offer online services such as online registration, donation, and polling. This is a new criterion that can be included in the SCANMIC model.

6.3.3 Summary

The survey reveals that most political organisations still do not recognise the Internet as the main political communication medium. Most still rely on traditional approach in disseminating messages to the general public such as through conventional print media, public talks and gatherings, public meetings, conferences, and seminars. To date, the web sites might still be considered secondary to other conventional methods of conveying information. As a result, there is lack of funding for web site projects and no initiative being made to assess the usability and content usefulness of their web sites.

Nonetheless, the survey indicates that most political organisations are beginning to realise the need to use web sites as an alternative medium to traditional print media. Most decide to increase their effort to get more funding for their future web projects that are aimed at improving the content delivery, design and maintenance of their web sites.

It was also found that there is not much difference between web developers' and Internet users' perceptions on the issues of web usability. Both groups recognise the importance of this issue in ensuring the effectiveness of web sites. However, the survey indicates that usability is not the only important factor that could contribute towards web success. Other factors such as proper funding, manpower with adequate web design expertise, and updated IT technology infrastructure should also be taken into consideration.

The web usability criteria including those that are specific to political web sites discussed so far were derived from the interview with the Internet users (stage 3.2.) and web developers (stage 3.3). The final method was the use of web content analysis method to further identify the criteria but it only focuses on the content factor (stage 4), which will be presented in the section 6.4.

6.4 Content Analysis of Political Web Sites (Stage 4)

This part will discuss findings on the content analysis of web sites (stage 4) using the Attracting, Informing, Positioning, and Delivery (AIPD) approach, which was explained in the methodology chapter (section 3.4.7). It begins with a brief summary on the AIPD approach and how it was applied, and then followed by the results of the analysis. A model for assessing content coverage for political web sites will also be presented.

6.4.1 AIPD Approach

The main objective of the content analysis was to discover the main criteria of content coverage for political web sites. The AIPD approach developed by Simeon (1999) was adopted mainly due its suitability and success when tested on commercial web sites. This approach relates to the use of the benchmarking techniques in comparing the Attracting, Informing, Positioning and Delivering content strategies of web sites. Attracting relates to a strategy that provides content that could attract as many people as possible to visit one's web site. Informing is a strategy that is related to the provision of web contents that are informative to visitors. Positioning is a strategy that creates an image and helps an organisation remain competitive. Finally, Delivery is related to the use of web technology in providing interactivity, reliability, security and speed of a web site.

In order to adopt the AIPD approach, elements of web contents that can be used as the criteria for assessing each content provision strategy were identified. Twenty political web sites from four different countries: Malaysia, United Kingdom, United States and

Australia (refer to Appendix XI) were analysed by three evaluators (refer to 3.4.7). The results will be described in the following sub section.

6.4.2 Results and AIPD Model

Although all the reviewed web sites are political sites, they differ in terms of contents and design layout. The differences in contents suggest that these web sites have different purposes and strategies. Hence, in this study, reviewers only concentrate on generic content elements that are applicable to all type of political web sites including political parties, pressure groups and non-governmental organisations. A total of 51 key content elements were identified as listed in Figure 6.1.

Figure 6.1: List of web elements for evaluating web content strategies

1. Announcements of activities/ events
2. Archive of previous press release
3. Audio clips
4. Campaign
5. Campaign banners
6. Choices of language
7. Contact details
8. Contact of politicians & public leaders
9. Database search (e.g. registered voters, media release)
10. e-forum/e-discussion
11. Enquiries on membership
12. Free email
13. Free e-postcard
14. Fund raising/ donation appeal
15. Games and quizzes
16. Guest book
17. High quality text (no grammatical or typo error)
18. History
19. Job advertisement
20. Links to local branches
21. Links to on-line news papers
22. Links to other political web sites
23. Links to politicians' homepages
24. Local Web search
25. Logo with description
26. Mission and vision
27. News headlines in main page
28. On-line forms (e.g. for feedback & registration)
29. Online membership
30. On-line polls/ readers polls
31. Online shopping
32. Organisational chart
33. Parliamentary debates/ reports
34. Photo gallery
35. Policies (e.g. on education, crime, health etc)
36. Press release
37. Professional screen layout
38. Profile/ about us
39. Q&A with politicians
40. Readers' comments
41. Readers opinion
42. Registration for email news
43. Reports/ publications
44. Speakers corner
45. Statistics
46. Technical help
47. Track record/ report card
48. Up-dated news
49. Video clips
50. Web radio
51. Web TV

All the identified key element of web contents were categorised into Attracting, Informing, Positioning and Delivery content strategies by the three reviewers as explained earlier. From this, a model for evaluating content strategies for political web sites was developed as shown in figure 6.2.

Figure 6.2: AIPD Model for content strategies of political web sites

<table>
<tr><td colspan="4">ATTRACT
• Guest book
• Readers' comments
• Readers opinion
• Q&A with politicians
• Video clips
• Audio clips
• Free email
• Photo gallery
• Registration for email news
• Free e-postcard
• Job advertisement
• Enquiries on membership
• Speakers corner
• Online membership
• News headlines in main page
• Campaign banners
• Online shopping
• Games and quizzes</td></tr>
<tr><td>I
N
F
O
R
M</td><td>• Profile/ about us
• Press release
• Archive of previous press release
• Organisational chart
• History
• Mission and vision
• Policies (e.g. on education, crime, health etc)
• Campaign
• Logo with description
• Announcements of activities/ events
• Fund raising/ donation appeal
• Contact details
• Reports/ publications
• Statistics</td><td>CONTENT STRATEGIES For POLITICAL WEB SITES</td><td>• Up-dated news
• Professional screen layout
• High quality text (no grammatical or typo error)
• Choices of language
• Links to other political web sites
• Links to local branches
• Links to on-line news papers
• Links to politicians' homepages
• Contact of politicians & public leaders
• Parliamentary debates/ reports
• e-forum/e-discussion
• technical help
• track record/ report card</td><td>P
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N</td></tr>
<tr><td colspan="4">• On-line forms (e.g. for feedback & registration)
• On-line polls/ readers polls
• Local Web search
• Database search (e.g. registered voters, media release)
• Web TV
• Web radio</td></tr>
<tr><td colspan="4">DELIVER</td></tr>
</table>

Attracting Strategy

Eighteen content elements were proposed for strengthening the Attracting strategic function as shown in Figure 6.2. The result of the study shows that most reviewed political web sites have some content elements that are commonly used to attract visitors. The most common elements are *readers' comments and opinion, video and audio clips, photo gallery, free email, news headlines in main page, and the campaign banners*. Apart from these, some web sites use other unique elements to attract more visitors. Malaysiakini.com (www.malaysiakini.com) for example, provides a section for *question and answer with politicians* over certain political issues. Another example is the Scottish Tories web site (www.scottishtories.org.uk) with its *speakers' corner* that allows visitors to voice out freely their views on any political and social issues.

Other web content elements that can be used to attract visitors are *job advertisements*, as introduced by the Labour Party (www.labour.org.uk) and the Democrats Party (www.democrats.org), and *online shopping* offered by the Republican Party (www.rnc.org). Reviewers also believed that *free news subscription* found in the Labour Party's site (www.labour.org.uk), the Democrats (www.democrats.org), and the Liberal Party (www.liberal.org.au) could potentially attract visitors. Finally, providing *games and quizzes* as found in the Liberal Party's web site (www.liberal.org.au), would also be beneficial in boosting the number of web site visits. One key content element that is not available in any political web sites in Malaysia is *online membership* although this element is very popular among web sites in the United States and Australia.

Informing Strategy

Providing information is undoubtedly one of the main purposes of a web site. The results of the analysis show a lot of similarity among the reviewed web sites in terms of their contents that are associated with the Informing strategy. *Profile or about us, history, organisational chart, mission and vision, contact details,*

and press release are a must for all reviewed sites. Although all web sites provide news section, some fail to realise the need for *an archive of previously published news and articles.* Another important criterion for the Informing strategy is the party or organisations' *policies* on, for example, education, crime, health and freedom of speech. Equally important is the information on current campaign, announcement of activities reports or publications, and fund raising or donation appeal.

Positioning Strategy

Gaining popularity and competitive edge are a necessity for political parties or organizations as these could garnish more support for their struggles. Using their Internet presence could be a good approach towards strengthening their position against competitors. The reviewers proposed a total of thirteen content elements as potential criteria for assessing the Positioning strategy. Merely having the news section is not enough but the news supplied in a web site should be updated regularly. Meanwhile, text and documents provided should achieve an acceptable standard with no grammatical and typographic error. Equally important is the provision of web site with choices of languages especially in multi-ethnic countries such as Malaysia and United States. This study shows that some web sites such as ALIRAN at www.malaysia.net/aliran/ and DEMOCRATS at www.democrats.org offer choices of languages for their audience.

The reviewers also felt that having a professional screen layout and appearance could make a difference for a web site. This could in fact be one of the factors that determine the credibility and trustworthiness of a web. The Australian Liberal Party's web site at www.liberal.org.au is a good example whereby its screen appearance is well designed in terms of choice of colour, navigation aids and content structure. Political web sites should also fully utilise the capability of Hyper Text Mark up Language (HTML) documents within web sites to make linkages to other related sites so that users do not have to search the web pages

on their own. Among the linkages proposed are *Links to other political web sites, Links to local branches, Links to on-line newspapers and Links to politicians' homepages*. In addition, having information on politicians' and public leaders' contact addresses could also be an added advantage.

Freedom of speech is considered vital for democratic process. However, there are always claims that this right has never been fully exercised even in democratic countries such as Malaysia. With the Internet, however, this problem can be minimised in the sense that it allows free transmission of data without much restriction. Having said this, reviewers believed that all political web sites should provide facilities for *e-forum or e-discussion* on key social and political issues.

Another important aspect of web content that could strengthen a position of a political party or organisation is to establish its *track record or report card* on the web. Three political organisations in this study - the American Green Party (www.greens.org), the Democrats (www.democrats.org.au) and the Liberal Party (www.liberal.org.au) have all provided their track records in politics.

Delivery Strategy

The Internet and Web technologies are moving very fast. From time to time, a new technology comes into place. The emerging technologies such as search engines, online forms, Active Server Pages, Web Intelligence, and JAVA applets can be used to boost web sites' delivering strategy. Six elements were suggested by the reviewers as suitable for delivering strategy (refer to Figure 6.2). The most popular facilities are *online forms* mainly for feedback and registration purposes, *online polls or reader polls*, and *local web search*. Another is *database search*, for example for checking registered voters and retrieving media release. The latest technology is the *Web Television* (WebTV) which can be used to televise events such as political gatherings, news and speeches on the

Internet. A good example is HARAKAH web site (www.harakah-daily.com) where it offers daily online news through WebTV.

6.4.3 Summary

The main objective of this study is to identify content of political web sites that could attract, inform, position and deliver (AIPD). After analysis of selected web sites, a total of fifty-one elements of content were identified. These elements were then grouped into the AIPD categories according to their suitability and judgement from the reviewers. The AIPD list of content elements can be used as a guide to those who intend to assess content strategies of political web sites.

A good political web site with clearly defined goals and is well designed is the one that has almost all elements of contents listed in the proposed model. This list can also be used to identify the weaknesses of a particular web site in terms of its content provision. Some web sites, for example, might be good at providing basic information to the audience but lack of ideas on how to attract regular visitors. Using this model, political web designers might be able to strengthen their position of the Internet presence so as to attract regular visitors.

6.5 Conclusions

The objective of identifying web usability criteria that are specific to political web sites was achieved through interviews with the Internet users and web developers, and content analysis of some selected political web.

Forty Internet users with different backgrounds (i.e. gender, age and education), Internet experience, and technology used to access the Internet participated in the interview. Most of web criteria proposed by the participants indicated that they generally preferred web sites which are easy to access, easy to use, and informative. Some of the criteria were already proposed by the experts in the expert review, and the remaining criteria are related mostly to content coverage of political web sites.

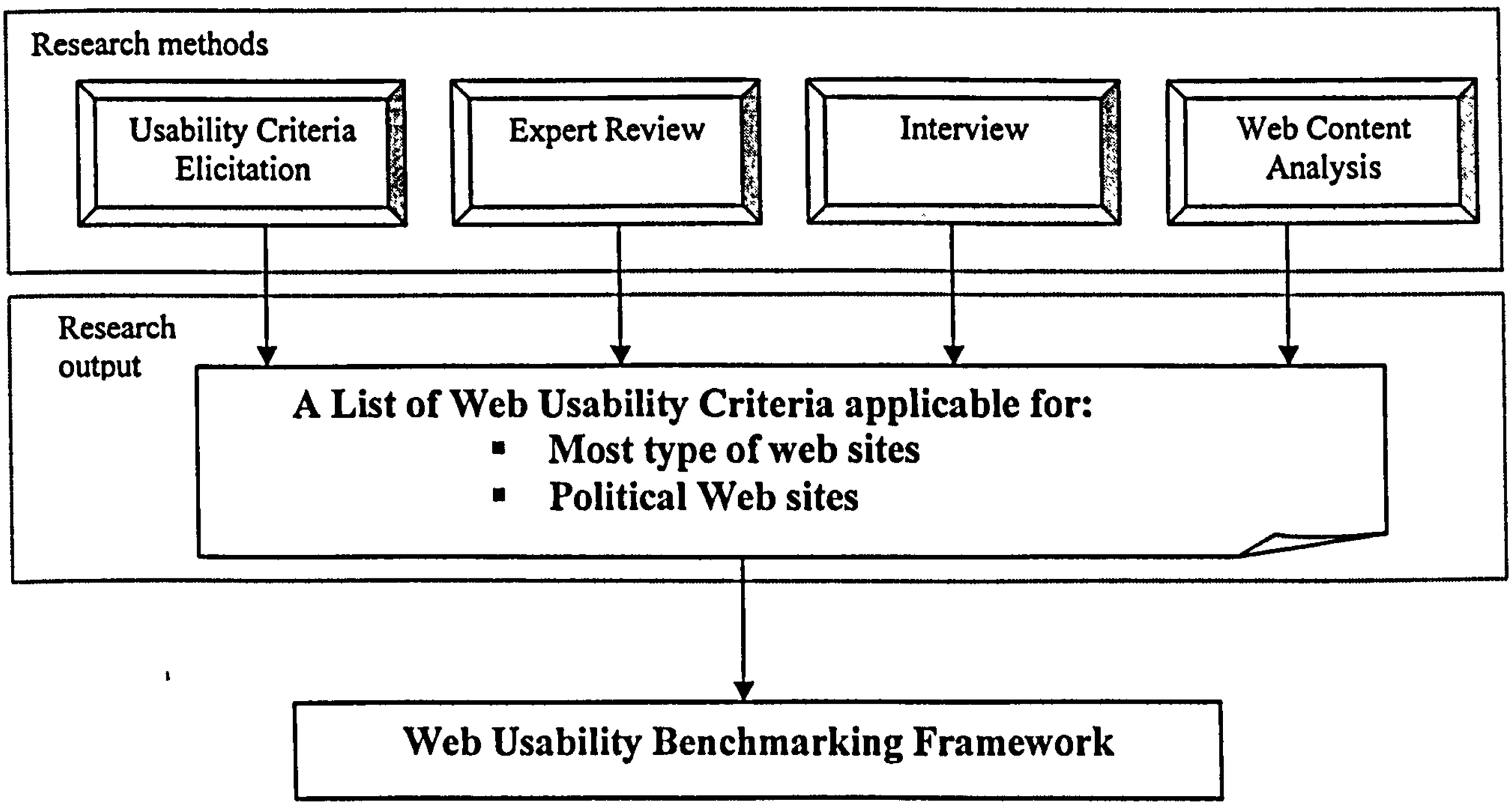
Five major political parties and a Non Governmental Organisation participated in the interview. Although the survey reveals that most political organisations still do not recognise the Internet as the main political communication medium, they begin to realise the need to use the web sites as alternative medium to traditional print media. Most had decided to increase their effort to get more funding for their future web projects that are aimed at improving the content delivery, design and maintenance of their web sites. It was found that there is not much difference between web developers' and Internet users' perceptions on the issues of web usability. Both groups recognise the importance of this issue in ensuring the effectiveness of web sites. However, the survey indicates that usability is not the only important factor that could contribute towards web success. Other factors such as proper funding, manpower with adequate web design expertise, and updated IT technology infrastructure should also be taken into consideration.

Web content analysis was carried out to identify content coverage of political web sites that could attract, inform, position and deliver (AIPD). Twenty political web sites from four different countries: Malaysia, United Kingdom, United States and Australia were analysed by three evaluators. A total of fifty-one elements of content were identified where they were then grouped into the AIPD categories according to their suitability and judgement from the reviewers.

A few difficulties were encountered when conducting the interview and web content analysis. First, arranging (or rearranging) appointments with the interview participants were very costly and time consuming. Some participants had to be contacted by telephone several times to decide on the meeting dates and few participants had cancelled the pre-arranged appointment due to emergencies. Second, analysing the data from the interview was a very difficult job due to its qualitative nature. The main difficulty was to isolate a criterion that was described differently by different participants. Third, placing criteria into the right AIPD category was not easy. Some of the criteria were considered related to more than one category.

A final list of web usability criteria derived from usability criteria elicitation, expert review, interview with the Internet users and web developers, and web content analysis, was used in a framework for benchmarking web usability (refer to figure 6.2), which will be discussed in the next chapter.

Figure 6.2: The process of identifying web usability criteria for benchmarking



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Chapter Seven

Evaluating Web Usability: Benchmarking Approach

7.1 Introduction

The massive growth of the Internet has resulted in huge levels of traffic and activities on the World Wide Web (WWW). In the middle of year 2001 alone, there were at least 2.46 billion web pages[1] in the cyberspace residing on 2.8 million Internet servers[2]. The stiff challenge faced by these web site owners is attracting target visitors.

As has been argued at length in chapter 2, one of the major areas of concern facing many web sites is web usability. Web sites with low usability could result in low page hits and failure of web sites. Thus, determining how usable a web site is indeed imminent. Until now there have been no reliable methods for assessing

[1] Statistics from Google.com at http://www.google.com on 20th August 2002

the usability of web sites particularly the methods that utilise benchmarking approach (the concept of this approach will be explained later).

This chapter presents a framework for evaluating the usability of web sites (with special focus on political web sites) by using the benchmarking approach (stage 5). The framework is based on the web usability criteria identified from the usability criteria elicitation (stage 1), expert review (stage 2), survey (stage 3), and content analysis of political web sites (stage 4). As explained earlier, the identified evaluation list was grouped into objective and subjective criteria. In this framework, only the objective criteria were used as the benchmarking metrics because they are absolute criteria that can be measured easily even by laypersons. In contrast, the subjective criteria are mostly relative measures that can only be evaluated qualitatively, and in some cases only by the experts.

In practice, however, as noted earlier in chapter four (section 4.3), it is very difficult to draw the line that separates the definition between the two types of criteria. This was the major obstacle faced by the participants in the brainstorming session. In some cases, they found that some criteria could be classified as 'objective' but involved evaluators' perception as well. For example, the criterion "non excessive use of colour for text", can be measured easily but the word 'non excessive' might be perceived differently by different people. In this framework, all criteria that were considered easy to measure were categorised as 'objective' by the evaluators.

Although only the objective criteria were used as the benchmarking metrics in this framework, it does not mean that the subjective criteria were ignored. It should be noted that almost all criteria, whether objective or subjective, identified in this research, were perceived as important by the Internet users and the interview participants. Therefore, the subjective criteria will be included in this framework as general guidelines to web developers, designers, evaluators, and students.

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[2] Statistics from WebAudit at http://www.webaudit.net on 15th June 2002

This chapter begins with a brief description on the purpose of the benchmarking (section 7.2), followed by the definition of the benchmarking concept (section 7.3), and the detail processes involved in web benchmarking (section 7.4). A discussion on other web usability issues that are not covered in the benchmarking is also presented (section 7.5). After a summary on the framework (section 7.6), there will be a report on the testing of the framework on political web sites in Malaysia (section 7.7).

7.2 The Purpose of the framework

The main purpose of this framework is to assist individuals or teams who intend to measure the usability of their web sites against those of their competitors or of similar types. It provides guidance to both technical and non-technical people who are involved in web evaluation projects on what, who, and how to benchmark web sites. This framework can also be used by those who want to know the generic usability criteria that need to be taken into account in determining the level of usability of one's web site.

7.3 What is benchmarking?

Benchmarking is about comparing ones' current performances and practices with others in the same area of interest or business (Codling, 1992; Bramham, 1997). The main objective is to determine our position compares to others. American Productivity and Quality Centre (APQC) defines benchmarking as;

> *...the practice of being humble enough to admit that someone else is better at something and being wise enough to learn how to match and even surpass them at it* (APQC, 1993).

The result of benchmarking is normally used for bridging the gap with the competitors and move from where ones are now to where ones want to be (Chang et al., 1995). There are many advantages that an organisation could gain from benchmarking, which include:

- Create awareness of changing consumer needs;
- Create a sense of urgency for change, and;
- Enable improvements through learning from others who are better.

Benchmarking can also be performed on web sites and can be divided into two types (Anderson, 1996; Bendell et al., 1993):

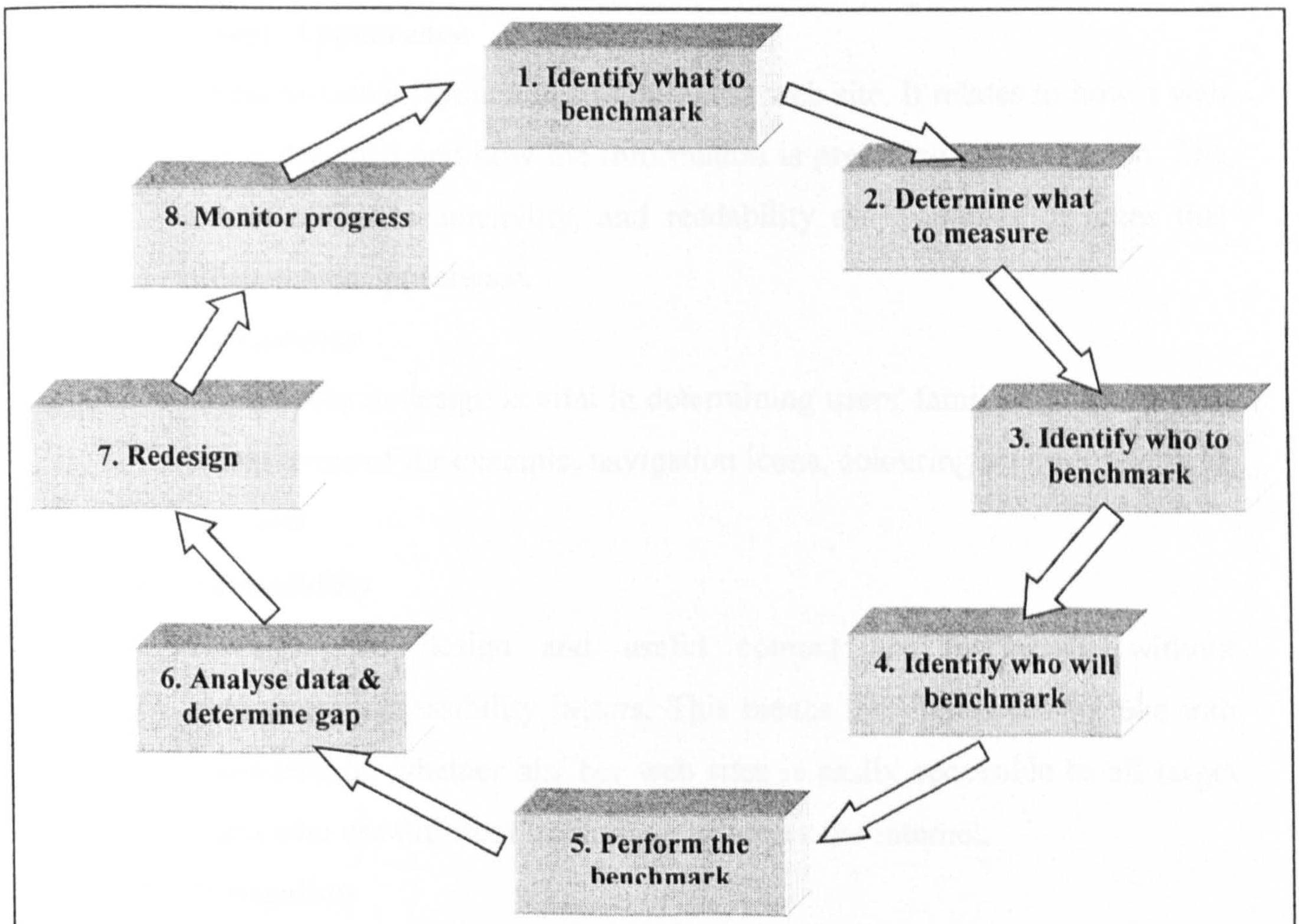
- Internal benchmarking, and;
- Competitive/ external benchmarking.

Internal web benchmarking is comparisons of web sites within the organisations' units, departments, or branches. Competitive web benchmarking is direct comparisons of one's web sites against those of competitors outside an organisation. Step by step processes for web benchmarking are discussed in the next section.

7.4 Eight (8) steps to web benchmarking

Web benchmarking is a continuos process of measuring and comparing one's web sites with others, which involves at least, eight steps as shown in figure 7.1.

Figure 7.1: Eight steps to web benchmarking[3]



Step 1: Identify what to benchmark

There are many aspects of web sites, which can be evaluated in order to improve their effectiveness and usefulness. One of them is usability, which is the main focus of this framework. *Web usability* is a concept that relates to *how convenient, practicable, and useful* a web site is for a user (IEEE, 1990; Marcus, 1999). A web site without major usability problems would guarantee its visitors at least, the following:

- They understand clearly how to start using the site as soon as they enter the main page;
- They can navigate easily and quickly within the site, and;
- They can find what they are looking for.

As discussed in chapter 3, web usability is a broad concept covering at least 7 major factors namely Screen Appearance, Consistency, Accessibility, Navigation, Media Use, Interactivity, and Content as detailed below:

- **Screen Appearance**

  Refers to visual layout and structure of a web site. It relates to how a web site is designed and how the information is presented on the screen. The use of colour, scannability, and readability are examples of areas that affect screen appearance.

- **Consistency**

  Consistency in design is vital in determining users' familiarity with a web site in terms of for example, navigation icons, colouring scheme, and page structure.

- **Accessibility**

  Having good design and useful content are inadequate without considering accessibility factors. This means that one needs to take into consideration whether his/ her web sites is easily accessible to all target users who use different technology to access the Internet.

- **Navigation**

  Usability also relates to how easy users can move around a web site. This is what navigation is about. Good navigation will help users find

[3] These steps were derived at by referring to general benchmarking processes proposed by Chang and Kelly (1995), Codling (1992), Bramham (1997), and Anderson (1996).

information easily and quickly especially for large web sites that have hundreds of web page linkages. Site map, table of contents, menu, and page linking are examples of web elements that affect navigation.

- **Media Use**

  Relates to the use of multimedia elements, both of static media (text and graphics) and continuos media (audio, animation, and video) to present information within web sites. Effective and proper use of media could enhance the way information is presented on screen.

- **Interactivity**

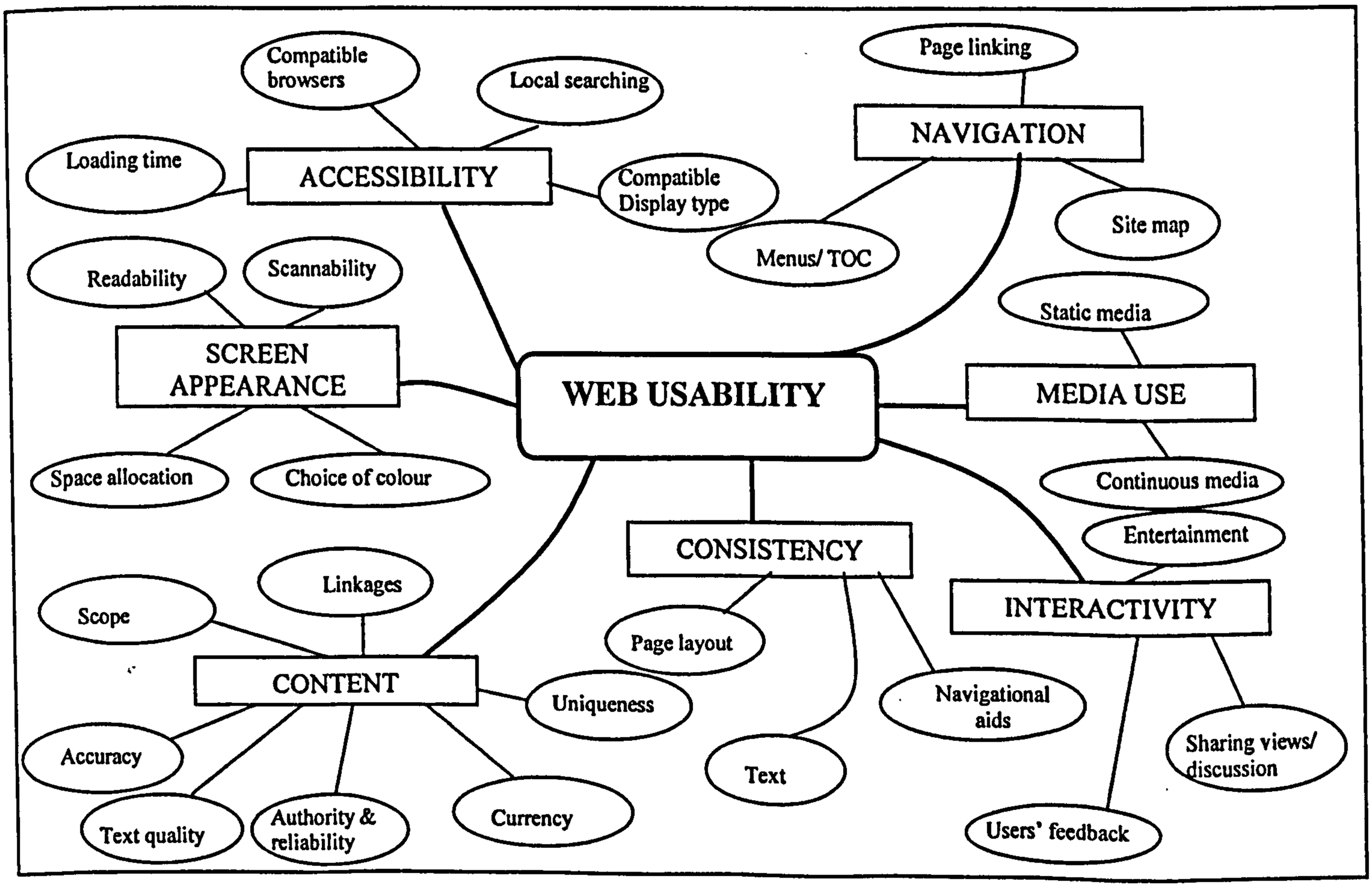
  This factor refers to the interactivity elements of web sites such as facilities for users to contact web masters, communicate with other users, and perform online enquiries.

- **Content**

  Content is normally the main reason why Internet users visit web sites. Hence, constant evaluation is needed to ensure that content provided in web sites is useful to users, reliable, relevant, and up to date.

Each of the SCANMIC factors has sub-categories as summarised below.

Figure 7.2: Factors affecting web usability: the SCANMIC Model



Considering the wide scope of web usability, those who intend to benchmark their web sites need to decide whether to benchmark all the 7 SCANMIC factors or only concentrate on certain factors. This decision depends on the purpose of the evaluation, time constraint, and the number of people involved.

Step 2: Determine what to measure

Once factors of web usability to benchmark have been decided, one needs to determine what measures to use for each factor. Table 7.1 provides the information on the number of measures (criteria) to be used in the benchmarking for all factors.

Table 7.1: The number of web usability criteria arranged by SCANMIC factors

SCANMIC Factors	No of Criteria
Screen Appearance	8
Consistency	3
Accessibility	3
Navigation	8
Media use	5
Interactivity	3
Content	16 (55*)
Total	46(85*)

Note: '*' refers to the number of content criteria for measuring political web sites.

Although web sites can be measured quantitatively or qualitatively, this framework only focus on quantitative measures by using 46 objective criteria (85 for measuring political web sites) as listed in table 7.2 to table 7.9. A brief discussion on the subjective measures will be presented later.

Screen Appearance

Table 7.2: List of Web Usability Criteria for Screen Appearance

Subcategory	Criteria for Screen Appearance
Choice of colour	• Non excessive use of colour for text • Sharp colour contrast between text and its background (e.g. black and white) • Use of colour to differentiate functional area (e.g. tool bar, menu bar and list of contents) with content display area
Readability	• Different text sizes to differentiate between titles, headings and texts • Avoidance of background images in the content display area
Scannability	• Clear titles for all pages • Clear headings and sub-headings for text/ document • Use of typography and skimming layout (e.g. bold fonts and highlighted words)

Consistency

Table 7.3: List of Web Usability Criteria for Consistency

Criteria for Consistency
• Consistent page layout throughout web site excepts main page (e.g. placement and size for content display, banners, and menu bar). • Consistent use of text in terms of its type, font size and colour. • Consistent use of navigational aids (e.g. menu bar, buttons and links in terms of graphics metaphor, size and colour).

Accessability

Table 7.4: List of Web Usability Criteria for Accessibility

Subcategory	Criteria for Accessibility
Display compatibility	• Compatible contents for all main browsers (Netscape and Microsoft Explorer) • Compatible contents between different versions of the same browser
Fast content Retrieval	• The use of local search facility

Navigation

Table 7.5: List of Web Usability Criteria for Navigation

Criteria for Navigation
• Menu/ list of key categories of contents in the main page • Menu/ list of key categories of contents in all sub-pages* • Links to the main page in all sub pages* • Accurate/ unbroken links • Use of sitemap • Menus are fit on screen (no scrolling) • Use of text within text link(where applicable) so that users can explore more if they wanted to • No/ short page scrolling

Note : '*' these criteria are not applicable to web sites that use frames or separate windows for sub-pages because the menus are displayed on the screen all the time.

Media Use

Table 7.6: List of web usability criteria for Media Use

Subcategory	Criteria for Media Use
Continuos/ time-based media (audio, animation and video)	• Control features for continuous media where appropriate (e.g. replay, control volume and turn off) • Alternative access (e.g. text version) to any information presented through continuous media • Avoidance of looping animation to prevent users' distraction
Static media (graphics, images, pictures)	• Labelling of all static media especially those used for menus and icons • Use of thumbnails to display photos

Interactivity

Table 7.7: List of web usability criteria for Interactivity

Criteria for Interactivity
• Availability of features for users' feedback about the site (e.g. web master's email address and on-line form) • Availability of features for sharing views and discussions (e.g. e-forum, net conference and net chatting) • Availability of entertainment features (e.g. online games and puzzles)

Content (Applicable for all types of web sites)

Table 7.8 (a): List of generic criteria for Content

Sub-category	Criteria for Content
Scope	▪ Suitable language for audience (choices of language are available for multi-ethnic audience) ▪ Up-to-date publication (e.g. news, articles, working papers etc) ▪ Archive of previously published materials
Authority and Reliability	▪ Information on authors and other documents (e.g. names and affiliation) ▪ References or sources of text and other documents ▪ Background information of institution/ organisation/ owner of the site (i.e. logo, name, address, phone number and email address)
Currency	▪ Up-to-date contents (i.e. resource date & page revision date are provided).
Uniqueness	▪ Options for output/ print format when appropriate (e.g. long pages) ▪ Choices of media type for a particular information (e.g. text only, audio or video) ▪ Information or warnings on file type and size for downloading ▪ Give-aways (e.g. e-cards, free emails)
Linkages	▪ Clear distinctions between internal and external links ▪ Links to other relevant sites (e.g. branches, sponsors)
Text Quality	▪ News/articles/documents/stories with pictures ▪ Summary of news/articles/documents/stories with links to full versions ▪ Divide news/articles/documents/stories according to scope (e.g. local and international)

Table 7.8 (a) presents the criteria for web contents that are applicable to all types of web sites. Table 7.8 (b) on the other hand, presents the criteria that are only applicable to political web sites[4].

[4] Political web sites are web sites that are used by political parties, NGOs, pressure groups, government agencies, and individuals, for disseminating political information and inviting people to participate in discussion on public issues.

Content (specific to political web sites)

Table 7.8 (b): List of generic criteria specifically for political web sites

Sub-category	Criteria for Content
Scope	*ATTRACT* (criteria to attract visitors) • Guest book • Readers' corner (comments/ opinion) • Q&A with politicians/ public figures • Recorded political events (video & audio clips) • Give-aways (e.g. free email, e-post cards) • Photo gallery • Registration for email news • Job advertisement • Enquiries on membership • Speakers corner • Online membership • Campaign banners • Online shopping0 • Suitable language for audience (choice of languages are provided for multi-ethnic audience) • News coverage of various issues • Civic/ religious corner *INFORM* (criteria to inform visitors) • Profile/ about us • Press release • Archive of previous press release • Organisational chart • History • Mission and vision • Policies (e.g. on education, crime, health etc) • Campaign • Logo with description • Announcements of activities/ events • Fund raising/ donation appeal • Reports/ publications • Statistics (e.g. election results analysis) *POSITION* (criteria to maintain competitive edge) ▪ Up-to-date contents especially news ▪ Choices of languages for multi-ethnic audience ▪ Contact of politicians & public leaders ▪ Parliamentary debates/ reports ▪ e-forum/e-discussion ▪ technical help ▪ track record/ report card *DELIVER* (criteria that utilise web technology to deliver contents) • On-line forms (e.g. for feedback & registration) • On-line polls/ readers polls • Database search (e.g. registered voters, media release) • Web TV • Web radio • Chatting room
Accuracy	▪ Clear distinction between informational and opinion content
Authority and Reliability	▪ Information on authors and other documents (e.g. names and affiliation) ▪ References or sources of text and other documents ▪ Background information of institution/ organisation/ owner of the site (i.e. logo, name, address, phone number and email address)
Uniqueness	▪ Options for output/ print format when appropriate (e.g. long pages) ▪ Choices of media type for a particular information (e.g. text only, audio or video) ▪ Information or warnings on file type and size for downloading
Linkages	▪ Clear distinctions between internal and external links

	▪ Links to other relevant sites (e.g. local branches, sponsors) ▪ Links to online news (local and international) ▪ Links to politicians' homepages
Text Quality	▪ News/articles/documents/stories with pictures ▪ Summary of news/articles/documents/stories with links to full versions ▪ Divide news/articles/documents/stories according to scope (e.g. Local & international)

Step 3: Identify who to benchmark

Once web sites are published, their owners need to know how well their web sites perform compare to others whose web sites have the same purpose with theirs. The identification of web sites to benchmark depends on the type of benchmark to be performed (i.e. internal or external benchmarking). When performing an internal benchmarking, ones shall select web sites of other units/ departments/ branches within the same organisation. On the other hand, when carrying out an external benchmarking, ones shall select a number of web sites of their closest competitors. Assuming that a designer is about to benchmark the web site of the Labour party, Newcastle Branch. In this case, an internal benchmarking would be to compare this web site with web sites of other branches, for example, the Labour party's branches in Manchester, London, and Leeds. However, if the designer's purpose is to perform an external benchmarking, then, he/ she needs to select web sites of the Labour party's closest competitors, for example, the Conservative and the National Party.

There is no specific number of web sites that should be used for web benchmarking. Once again, it will depend on the budget and time frame of a benchmarking project. However, it is advisable to select more than two web sites for better comparisons.

Step 4: Identify who will benchmark

Selecting evaluators will not be difficult because they do not have to be experts in Human Computer Interaction, Web Usability, or Information Retrieval. The metrics used in the benchmarking are based on web usability criteria that are easily understood by general Internet users. Evaluators could be any individuals with the following characteristics:

- They are competent and frequent Internet users who are familiar with web sites environment and terminology, and;
- They are independent evaluators (not members of the design team) so that the issue of potential bias can be avoided.

The number of evaluators to be used in the benchmarking will depend on the time frame and budget provided for web evaluation project. However, for quick and better results, at least two evaluators should be selected.

Step 5. Perform the benchmark

Once one has identified what to benchmark (step 1), what measures to use (step 2), who to benchmark (step 3), and who will benchmark (step 4), the benchmarking process can be conducted. First, prepare the necessary equipment and a suitable room for the benchmarking. A minimum of two computers should be used with the specifications described in table 7.9:

Table 7.9: Computer specifications for web benchmarking

	processor	*Random Access Memory (RAM)*	*Internet access*	*Internet browser*	*Screen resolution*
Computer 1	Low speed (e.g. Pentium 1/ equivalent)	Low Memory (e.g. 32 Megabytes/ lower)	Low speed Modem (e.g. 33Kbps/ lower)	Lower versions of Netscape/ Internet Explorer	Low screen resolution (e.g. 640 X 480 pixels)
Computer 2	Medium/ high speed (e.g. Pentium 2/ equivalent/ higher)	Medium/ high Memory (e.g. 64 Megabytes/ higher)	Medium/ high speed Modem (e.g. 56Kbps/ higher/ LAN connection)	Higher versions of Netscape/ Internet Explorer	Medium/ higher screen resolution (e.g. 800 X 600 pixels/ higher)

Computers with different specifications, network connection capabilities, Internet browser versions and screen resolutions as described above, are necessary to assess few usability aspects of web sites particularly those related to display compatibility. Furthermore, not all Internet users are using the latest computer technology with high specification. Some of them are still accessing the Internet through their outdated computers with low specification.

When the necessary equipment is ready, a briefing session on the purpose of benchmarking and how to carry it out should be given to the evaluators. Each evaluator should be provided with one benchmarking form (see figure 7.3 to 7.5) for each web site. The forms will then be filled by the evaluators while assessing the selected web sites. The evaluators will identify whether each criterion listed in the

form exists within the web site. They will tick "YES" for criteria existence, "NO" for non-existence, and in some cases "NA" for criteria that are not applicable.

Figure 7.3: Benchmarking form for Screen Appearance, Consistency, and Accessibility.

Web Usability Benchmarking

URL: _____

Date: _____ **Time:** _____

Evaluator's Name: _____

1. Screen Appearance

Subcategory	Criteria	YES	NO
Choice of colour	1. Non excessive use of colour for text (e.g. brown for titles and all black for main content)	( )	( )
	2. Sharp colour contrast between text and its background (e.g. black fonts on white background)	( )	( )
	3. Use of colour to differentiate functional area (e.g. tool bar, menu bar and list of contents) with content display area	( )	( )
Readability	4. Different text sizes to differentiate between titles, headings and texts	( )	( )
	5. Avoidance of background images in the content display area	( )	( )
Scannability	6. Clear titles for each pages	( )	( )
	7. Clear headings, sub headings for text/ document	( )	( )
	8. Use of typography and skimming layout (e.g. bold fonts and highlighted words)	( )	( )
Total		(/8)	(/8)

2. Consistency

Criteria	YES	NO
1. Consistent page layout through out web site excepts main page (e.g. placement and size for content display, banners, and menu bar).	( )	( )
2. Consistent use of text in terms of its type, font size and colour.	( )	( )
3. Consistent use of navigational aids (e.g. menu bar, buttons and links in terms of graphics metaphor, size and colour).	( )	( )
Total	(/3)	(/3)

3. Accessibility

Subcategory	Criteria	YES	NO
Display compatibility	1. Compatible contents for all main browsers (e.g. Netscape and Microsoft Explorer)	( )	( )
	2. Compatible contents between different versions of the same browser	( )	( )
Fast content retrieval	3. The use of local search facility	( )	( )
Total		(/3)	(/3)

Figure 7.4: Benchmarking form for Navigation, Media Use, and Interactivity.

4. Navigation

Criteria	YES	NO
1. Menu/ list of key categories of contents in the main page*	( )	( )
2. Menu/ list of key categories of contents in all sub-pages*	( )	( )
3. Links to the main page in all sub pages*	( )	( )
4. Accurate/ unbroken links	( )	( )
5. Use of sitemap	( )	( )
6. Menus are fit on screen (i.e. users do not have to scroll to see menus)	( )	( )
7. Use of text within text link(where applicable) so that users can explore more if they wanted to	( )	( )
8. No/ short page scrolling	( )	( )
Total	(/8)	(/8)

Note : '*' these criteria are not applicable to web sites that use frames or separate windows for sub-pages because the menu are displayed on the screen all the time. In this case, tick 'YES' for assessment purposes.

5. Media Use

NA (i.e. Not Applicable) option is provided in the form for this category since not all web sites utilise all media elements.

Subcategory	Criteria	YES	NO	NA
Continuos/ time-based media (audio, animation and video)	1. Control features for continuous media where appropriate (e.g. replay, control volume and turn off)	( )	( )	( )
	2. Alternative access (e.g. text version) to any information presented through continuous media	( )	( )	( )
	3. Avoidance of looping animation to prevent users' distraction	( )	( )	( )
Static media (graphics, images, pictures)	4. Labelling of all static media especially those used for menus and icons	( )	( )	( )
	5. Use of thumbnails to display photos (i.e. small icon-sized pictures with options for larger images)	( )	( )	( )
Total		(/5)	(/5)	(/5)

6. Interactivity

Criteria	YES	NO
1. Availability of features for users' feedback about the site (e.g. web master's email address and on-line form)	( )	( )
2. Availability of features for sharing views and discussions (e.g. e-forum, net conference and net chatting)	( )	( )
3. Availability of entertainment features (e.g. online games and puzzles)	( )	( )
Total	(/3)	(/3)

The next two forms (figure 7.5(a) and 7.5 (b)) contain a list of criteria for web contents. When measuring the usability of general web sites, the form in figure 7.5 (a) should be used. However, when measuring political web sites, the form in figure 7.5 (b) should be used.

Figure 7.5(a): Benchmarking form for Contents

7(a). Content (FOR GENERAL WEB SITES)

Subcategory	Criteria	YES	NO
Scope	1. Suitable language for audience (choices of language are provided for multi-ethnic audience)	( )	( )
	2. Up-to-date publication (e.g. news, articles, working papers etc)	( )	( )
	3. Archive of previously published materials	( )	( )
Authority and Reliability	4. Information on authors and other documents (e.g. names and affiliation)	( )	( )
	5. References or sources of text and other documents	( )	( )
	6. Background information of institution/ organisation/ owner of the site (i.e. logo, name, address, phone number and email address)	( )	( )
Currency	7. Up-to-date contents (i.e. provide resource date and page revision date).	( )	( )
Uniqueness	8. Options for output/ print format when appropriate (e.g. long pages)	( )	( )
	9. Choices of media type for a particular information (e.g. text only, audio or video)	( )	( )
	10. Information or warnings before executing users' requests (e.g. file type and size for downloading)	( )	( )
	11. Give-aways (e.g. e-cards, free emails)	( )	( )
Linkages	12. Clear distinctions between internal and external links	( )	( )
	13. Links to other relevant sites (e.g. branches, sponsors)	( )	( )
Text Quality	14. News/articles/documents/stories with pictures	( )	( )
	15. summary of news/articles/documents/stories with links to full versions	( )	( )
	16. divide news/articles/documents/stories according to scope (e.g. local & international)	( )	( )
Total		(/ 16)	(/16)

Figure 7.5 (b): Benchmarking form for Content that are applicable only for political web sites

7(b). Content (specific to political web sites)

Subcategory	Criteria	YES	NO
Scope ATTRACT	1. Guest book	( )	( )
	2. Readers' corner (comments/ opinion)	( )	( )
	3. Q&A with politicians/ public figures	( )	( )
	4. Recorded political events (video & audio clips)	( )	( )
	5. Give-aways (e.g. free email, e-post cards)	( )	( )
	6. Photo gallery	( )	( )
	7. Registration for email news	( )	( )
	8. Job advertisement	( )	( )
	9. Enquiries on membership	( )	( )
	10. Speakers corner	( )	( )
	11. Online membership	( )	( )
	12. Campaign banners	( )	( )
	13. Online shopping	( )	( )
	14. Suitable language for audience	( )	( )
	15. News coverage of various issues	( )	( )
	16. Civic/ religious corner	( )	( )

INFORM	17. Profile/ about us	( )	( )
	18. Press release	( )	( )
	19. Archive of previous press release	( )	( )
	20. Organisational chart	( )	( )
	21. History	( )	( )
	22. Mission and vision	( )	( )
	23. Policies (e.g. on education, crime, health etc)	( )	( )
	24. Campaign	( )	( )
	25. Logo with description	( )	( )
	26. Announcements of activities/ events	( )	( )
	27. Fund raising/ donation appeal	( )	( )
	28. Reports/ publications	( )	( )
	29. Statistics (e.g. election results analysis)	( )	( )
POSITION	30. Up-to-date contents especially news	( )	( )
	31. Choices of languages for multi-ethnic audience	( )	( )
	32. Contact of politicians & public leaders	( )	( )
	33. Parliamentary debates/ reports	( )	( )
	34. Technical help	( )	( )
	35. Track record/ report card	( )	( )
DELIVER	36. On-line forms (e.g. for feedback & registration)	( )	( )
	37. On-line polls/ readers polls	( )	( )
	38. Database search (e.g. registered voters, media release)	( )	( )
	39. Web TV	( )	( )
	40. Web radio	( )	( )
	41. Chatting room	( )	( )
Accuracy	42. Clear distinction between informational and opinion content	( )	( )
Authority and Reliability	43. Information on authors and other documents (e.g. names and affiliation)	( )	( )
	44. References or sources of text and other documents	( )	( )
	45. Background information of institution/ organisation/ owner of the site (i.e. logo, name, address, phone number and email address)	( )	( )
Uniqueness	46. Options for output/ print format when appropriate (e.g. long pages)	( )	( )
	47. Choices of media type for a particular information (e.g. text only, audio or video)	( )	( )
	48. Information or warnings before executing users' requests (e.g. file type and size for downloading)	( )	( )
Linkages	49. Clear distinctions between internal and external links	( )	( )
	50. Links to other relevant sites (e.g. local branches, sponsors)	( )	( )
	51. Links to online news (local and international)	( )	( )
	52. Links to politicians' homepages	( )	( )
Text Quality	53. News/articles/documents/stories with pictures	( )	( )
	54. Summary of news/articles/documents/stories with links to full versions	( )	( )
	55. Divide news/articles/documents/stories according to scope (e.g. local & international)	( )	( )
Total		(/55)	(/55)

6. Analyse data and determine the gap

The next step is to analyse the data derived from step 5. First, the data can be summarised by counting the number of existence (YES) and non-existence (NO) of the criteria for each SCANMIC category. An example of a form that can be used for this is shown in figure 7.6.

Figure 7.6: Summary of the number of existence and non-existence of web usability criteria for each sub sections of the SCANMIC categories.

	Web Site A			**Web Site B**			**Web Site C**		
	YES	NO	NA	YES	NO	NA	YES	NO	NA
Screen Appearance (F1) *Choice of colour (/3)* *Readability (/2)* *Scannability (/3)*									
Total (/8)									
Consistency (F2) (/3)									
Accessibility (F3) *Display Compatibility (/2)* *Search facility (/1)*									
Total (/3)									
Navigation (F4) (/8)									
Media use (F5) *Static Media (/3)* *Continuous Media (/2)*									
Total (/5)									
Interactivity (F6) (/3)									
Content (for general web sites -F7) *Scope (/3)* *Authority & Reliability (/3)* *Currency (/1)* *Uniqueness (/4)* *Linkages (/2)* *Text Quality (/3)*									
Total (/16)									
Grand Total (/46)									
Note: if evaluating political web sites, use the following section for calculating contents									
Content (for political web sites - F7) *Scope* *Attract (/16)* *Inform (/13)* *Position (/6)* *Deliver (/6)* *Accuracy (/1)* *Authority & Reliability (/3)* *Uniqueness (/3)* *Linkages (/4)* *Text Quality (/3)*									
Total (/55)									
Grand Total (/85)									

Then, the data can be further analysed to identify the usability level of the web sites that are being benchmarked as exemplified below:

Figure 7.7: An example of calculation for percentage web usability index for 3 general web sites.

SCANMIC Factors	Web Site A			Web Site B			Web Site C		
	YES	NO	NA	YES	NO	NA	YES	NO	NA
F1 (/8)	a_A	h_A		a_B	h_B		a_C	h_C	
F2 (/3)	b_A	i_A		b_B	i_B		b_C	i_C	
F3 (/3)	c_A	j_A		c_B	j_B		c_C	j_C	
F4 (/8)	d_A	k_A		d_B	k_B		d_C	k_C	
F5 (/5)	e_A	l_A	o_A	e_B	l_B	o_B	e_C	l_C	o_C
F6 (/3)	f_A	m_A		f_B	m_B		f_C	m_C	
F7 (/16)	g_A	n_A		g_B	n_B		g_C	n_C	
Total (/46)	$\sum a_A+...+g_A$	$\sum h_A+...+n_A$	$\sum o_A$	$\sum a_B+...+g_B$	$\sum h_B+...+n_B$	$\sum o_B$	$\sum a_C+...+g_C$	$\sum h_C+...+n_C$	$\sum o_C$
	YES_A	NO_A	NA_A	YES_B	NO_B	NA_B	YES_C	NO_C	NA_C

% Usability Index for Web Site A $= U_A = \left(\frac{YES_A}{46 - NA_A} \right) \times 100$ OR $= U_A = \left(\frac{46 - NO_A}{46 - NA_A} \right) \times 100$

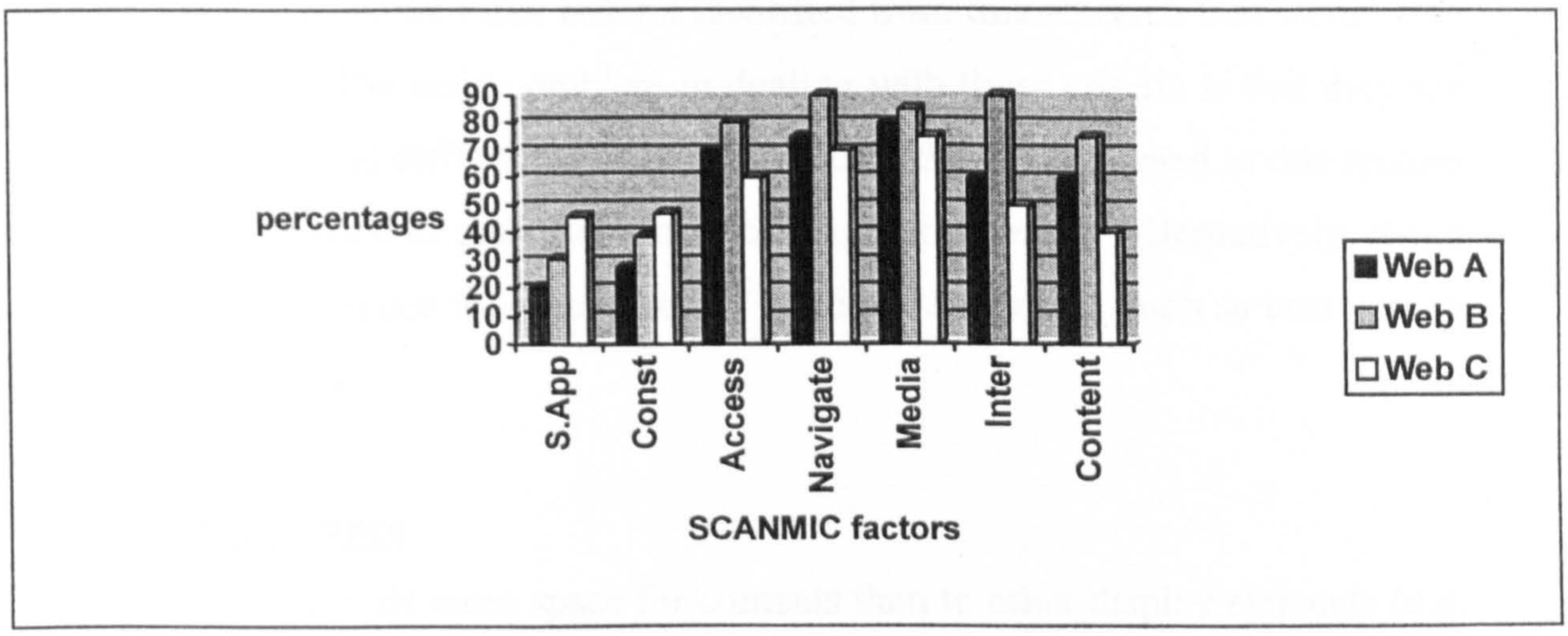
% Usability Index for Web Site B $= U_B = \left(\frac{YES_B}{46 - NA_B} \right) \times 100$ OR $= U_B = \left(\frac{46 - NO_B}{46 - NA_B} \right) \times 100$

% Usability Index for Web Site C $= U_C = \left(\frac{YES_C}{46 - NA_C} \right) \times 100$ OR $= U_C = \left(\frac{46 - NO_C}{46 - NA_C} \right) \times 100$

NOTE: when benchmarking political web sites, the total number of criteria is 85, hence, 85 should replace 46 in the formula.

From the analysis such as shown in figure 7.7, the gap that exists between the web sites can be determined. If $U_B > U_A$ and $U_B > U_C$, then web site B shows higher usability level than web site A and C. To see more clearly on the gap, plotting charts such as bar charts based on the results might be useful. An example for this is shown in figure 7.8. In this example, web site A scores poorly in the aspects of Screen Appearance and Consistency, whereby web site C has the lowest score in the areas of Accessibility, Navigation, Media Use, Interactivity and Content. These results can be used by designers of web site A and C to consider redesigning their web sites.

Figure 7.8: Bar charts that compare the usability level of web site A with its competitors, Web site B and C.



7. Redesign

The results derived from steps 5 and 6 will help identify weaknesses and strengths of one's web site against others in terms of usability. In particular, areas of concern that need to be modified and enhanced can be located. Due to the dynamic nature of web sites and the Internet technology, redesigning web sites has become a continuous process. As such, the result from the benchmarking should also be of help for web developers in their web redesign process. In some cases, web redesign and enhancements would require more money and manpower. Thus, the benchmarking results can also be used to justify the need for more funding in web projects.

8. Monitor progress

After redesign process (if necessary), the next step is to monitor the progress of the new version of the web site. Several ways can be conducted to achieve this such as counting page hits, tracking user logs, and identifying the level of sales volume (in case of e-commerce sites). After several months (depending on one's budget and manpower), web benchmarking should be repeated to track progress as compared to others in similar fields or business.

7.5 Dealing with Subjective Criteria of Web Usability

Apart from the objective criteria used in web usability benchmarking as discussed in section 7.4, there are other criteria identified from this research that would also affect usability. The major problem in dealing with these criteria is that they are very subjective and difficult to measure. As such, the list presented in this section should only be used as guidelines in web design or redesign. Alternatively, it can be used as a reference for web usability qualitative research such as user survey and expert review.

Screen Appearance

Guideline 1: Provide more space for contents than to other display elements (e.g. menu bar, list of contents, and advertisement banners).

There are two main elements of web sites - content and navigation aids. It is the content that drives users to visit web sites, whereas navigation is needed only to guide them browsing the content and finding what they are looking for. Hence, more space should be provided for content display especially in sub pages (or leaf pages). Spaces for other elements such as navigation icons, menus, and advertisements should be minimised.

Guideline 2: Use simple layout throughout the web site.

Although the layout for a homepage (main page) can be different from its sub-pages, it should be simple and consistent. The layout for a homepage, for example, should be properly structured and not too crowded with graphics and animations. The spaces provided for menus, advertisements, and list of contents should be clear to users. The page should not be too long since it will cause long scrolling. The layout for sub pages should also be simple and designed in such a way that users can easily understand how to navigate the site. The use of navigation aids, colouring scheme, and frames should be consistent throughout the web site.

Guideline 3: Provide a good structure for content.

The good structure of web content will help users:

- Understand what the site is offering, and;

- Find what they are looking for easily.

Content should be grouped properly according to their scope. A list of contents (main menu) should be provided not only in the main page but also in all sub-pages. Equally important is the consistency in the placement of all web elements within pages including menus, advertisement, and animations.

Guideline 4: Use conservative colour.

It is advisable to use conservative colour scheme especially when designing web sites for adult users. Conservative colour here means any colour (or combination of colour) that are not too bright, for example, white/ light grey on black background.

Guideline 5: Use fonts that are easy to read and commonly used.

There are many types of fonts that can be used in web pages, but not all of them are suitable for online reading. Hence, the choice of fonts is important to ensure that users can read the text easily. The fonts that are normally used in web pages are Times New Roman (Times) and Verdana.

Guideline 6: Use short paragraphs with short sentences.

Apart from fonts, long paragraph could also affect reading. Hence, it is advisable to use short paragraph with short sentences (about 4 to 6 sentences) and limit a paragraph only to one idea.

Guideline 7: Use the inverted pyramid writing style where you start with the conclusion.

This is a writing style used in journalism to attract readers. Web users normally prefer to scan for key content of text (e.g. articles and news) before deciding to read the whole text. Therefore, providing the conclusion at the beginning of text would help users to get the general idea of its content.

Accessibility

Guideline 8: Acceptable loading time.

This research has found that loading time is the most important criteria in determining the usability of one's web site. Hence, web pages should be designed

in such a way that they can appear quickly on users' monitors. It is however; very difficult to determine the exact loading time that is accepted by users. Some experts claimed that the acceptable limit is about 10 seconds depending on the content of web pages and the technology used by users to access the Internet. Careful utilisation of multimedia elements in web pages could speed up their loading time.

Navigation

Guideline 9: The wording for each category of contents is meaningful to users.
Users scan menus or table of contents to get the general idea of what the site is offering. Proper wording for each menu is important to ensure that they reflect the content inside the site.

Guideline 10: Contents should be grouped into a small number of key categories.
Contents should be organised hierarchically from very general to very specific categories. It should start with a small number of key categories (experts suggestion was between 5 to 9) followed by sub-categories within sub-pages. This would help users identify key contents easily and speed up their navigation within a web site.

Guideline 11: Small number of steps/ links to arrive at a particular information (rule of thumb is 3).
Contents that users look for are normally residing somewhere within web sites' sub-pages. This means that users have to enter deeper into the site to achieve their goals. A good web site will be the one, which provides small number of steps/ links/ clicks for users to arrive at particular information. There are several ways to do this including designing a flat site structure and effective internal search engine.

Guideline 12: Use 'standard' navigation aids.
Using standard navigation aids (i.e. navigation aids that are commonly used for web sites) would speed up users' learning on how to use web sites. Graphics icons, symbols, and positioning of menu bar are examples of navigation aids that should be utilised properly.

Media Use

Guideline 13: Use of continuous media to suit contents (e.g. demonstration, instruction, and speeches).

The use of any piece of continuous media (audio, video, or animation) should be meaningful and suit the contents. Unnecessary use of such media will lead into long page downloading and crowded pages. Normally, continuous media are used for demonstration, instruction, and speeches. Nonetheless, it is recommended that users be provided with options or alternative types of media for displaying information, for example, text only, audio only, or video only versions. Allowing users to download files is also a common practise.

Guideline 14: Use of static media to enhance the information being presented.

Any text (e.g. documents, reports, manuals, and news) could be enhanced through the use of pictures or graphics images. Reporting an earthquake disaster, for example, should be included with a few pictures to give ideas to readers on its severity.

Guideline 15: Non-excessive use of static media in all pages.

Despite its potential benefits, the use of excessive static media could cause crowded pages and affect page downloading. Hence, the number of static media used within each page should be minimised and controlled. In addition, the sizes and pixel resolution of all static media should also be reduced accordingly.

Content

Guideline 16: Contents provided meet the expectation of target users.

This is the most difficult criterion to be achieved. Users vary in terms of their objectives and expectations. However, web designers should ensure that at least the expectations of most visitors are met by providing appropriate contents based on the sites' objectives. Visitors of online news, for example, would expect the site to provide the latest up-to-date news on current events. Visitors of travel agent's web site, on the other hand, would expect information on holiday bargains. Hence, web designers should provide contents that reflect the purposes of the site.

Guideline 17: High quality writing (e.g. good grammar and no typographical error)

The quality of any writings provided within web site should be controlled especially in terms of its content, grammar, and typography.

Guideline 18: Use of simple language and passages that are easy to understand.

Visitors' levels of language commands and understanding are different between each other. Therefore, all writings provided in web sites should use simple and straightforward language and passages that are easy to understand by general users.

Guideline 19: Accurate title for news/articles/documents/stories.

Time is priceless for visitors. They do not like wasting too much times trying to locate information (e.g. news/ articles/ documents/ stories). In this regard, titles for all writings especially for news/articles/documents/stories should be meaningful and accurate.

Guideline 20: Attractive headings or titles for news/articles/documents/stories

Apart from accurate and meaningful as outlined in guideline 19, headings for news/articles/documents/stories should also be attractive that would encourage visitors to read them.

7.6 Summary

Whether working individually or in a team, this framework can be of assistance in explaining how web benchmarking can be performed. It helps web evaluators in identifying the main weaknesses and strengths of a web site in seven general areas namely Screen Appearance, Consistency, Accessibility, Navigation, Media Use, Interactivity, and Content. Additionally, the benchmarking approach also allows web site owners to track the usability level of their competitors. Web benchmarking is a continuous process that can be performed based on eight processes as follows:

1. Identify what to benchmark;

2. Determine what to measure;
3. Identify who to benchmark;
4. Identify who will benchmark;
5. Perform the benchmark;
6. Analyse data and determine gap;
7. Redesign, and;
8. Monitor progress.

A total of 46 objective criteria are used as the metrics for benchmarking general web sites. Meanwhile, 85 objective criteria are identified as suitable to be used as the metrics for measuring political web sites. Although the main focus of the benchmarking is on objective criteria, the subjective criteria are also listed as general web design guidelines.

In order to know whether the framework can be applied in practise, the benchmarking was performed on selected political web sites in Malaysia, which will be discussed in detail in the next section.

7.7 Web Usability Benchmarking: Framework Testing

Web usability benchmarking framework had been designed and presented in earlier sections (section 7.2 to 7.5). The final stage of this research (stage 6) is to test the applicability of the framework in the Malaysian environment. Although the framework can be applied either to general web sites or political web sites, the testing is performed only on political web sites due to following reasons:

1. The main focus of the research is on political web sites, which is closely related to Cyberdemocracy, and;
2. The metrics used for benchmarking both political and non-political web sites are similar in most categories except content.

The main purposes of the benchmarking are threefold:

1. To test the suitability of the criteria in terms of wordings and terminology used;

2. To test the practicality of the eight benchmarking steps and proposed calculation methods, and;
3. To identify the level of usability of major political web sites in Malaysia.

The following sub-section will discuss the processes involved in the benchmarking.

7.7.1 Benchmarking Processes

The testing was conducted based on the proposed eight steps of benchmarking described as follows:

Step One and Two: Identify what to benchmark and what to measure

The benchmark only focussed on the benchmarking of web usability that covers 7 key areas of Screen Appearance, Consistency, Navigation, Media Use, Interactivity, and Content, called SCANMIC factors. The list of the criteria used as the benchmarking metrics is shown in figures 7.2, 7.3, and 7.4 (b).

Step Three: Identify who to benchmark

This benchmark could be considered as an external benchmarking because it involved comparisons between different political web sites in Malaysia. Four major political web sites were selected with justifications as shown in the following table.

Table 7.10: A list of Web Sites used in the benchmarking

	Web Site Owner	*URL*	*Reasons for Selection*
1.	National Front Party (BN)	http://www.bn.org.my	Very strong ruling party
2.	Pan-Islamic Party (PAS)	http://www.parti-pas.org	Very strong opposition party dominated by Malays.
3.	Democratic Action Party (DAP)	http://dapmalaysia.org	Very strong opposition party dominated by Chinese.
4.	ABIM	http://www.abim.org.my	One of the largest NGOs

Step Four: Identify who will benchmark

Two evaluators were invited to participate in the benchmarking. They were both expert Internet users who have been using the Internet for more than 5 years.

Step Five: Perform the benchmark

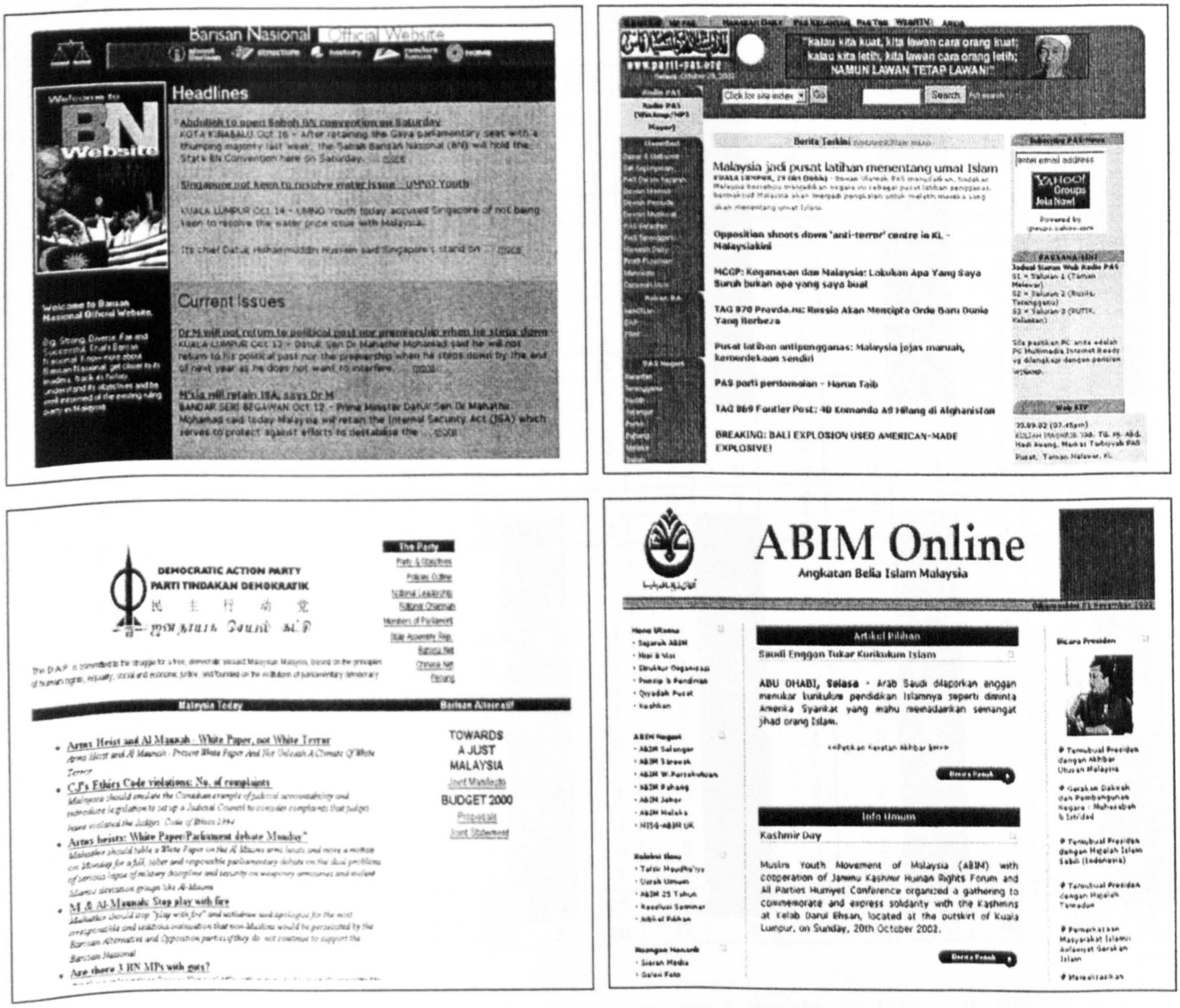
The participants were grouped in a room occupied with 2 computers with the following specifications.

Table 7.11: Computer specifications for web benchmarking

	Processor	*Random Access Memory (RAM)*	*Internet access*	*Internet browser*	*Screen resolution*
Computer 1	Pentium 1	32 Megabytes	33 Kbps Modem	Netscape 4.5 & Int. Explorer 5.0	640 X 480 pixels
Computer 2	Pentium 2	128 Megabytes	56 Kbps Modem	Netscape 6.2 & Int. Explorer 6.0	800 X 600 pixels

The evaluators were briefed on the purposes of the benchmarking and what they were supposed to do. Four benchmarking forms were supplied to the evaluators before they started the benchmarking (refer to figures 7.3, 7.4, and 7.5 (b)). Using the forms, the evaluators then performed the benchmarking for about 3 hours on the selected web sites (see figure 7.9).

Figure 7.9: Four selected political web sites in the benchmarking[5]



Step Six: Analyse data and determine gap

After the benchmarking, all forms were collected from the evaluators. The number of criteria existence and non-existence were calculated and summarised as presented in figure 7.10.

[5] The National Front Party (http://www.bn.org.my), The Malaysian Pan Islamic Party (http://www.parti-pas.org), The Democratic Action Party (http://www.malaysia.net/dap) and The Islamic Youth Movement (http://www.abim.org.my).

Figure 7.10: Summary of the number of existence and non-existence of web usability criteria for each sub sections of the SCANMIC categories.

	BN			PAS			DAP			ABIM		
	YES	NO	NA	YES	NO	NA	YES	NO	NA	YES	NO	NA
Screen Appearance (F1)												
Choice of colour (/3)	2	1		3	0		2	1		2	1	
Readability (/2)	2	0		1	1		2	0		2	0	
Scannability (/3)	3	0		2	1		3	0		3	0	
Total (/8)	7	1		6	2		7	1		7	1	
Consistency (F2) (/3)	1	2		3	0		3	0		2	1	
Accessibility (F3)												
Display Compatibility (/2)	2	0		2	0		2	0		2	0	
Search facility (/1)	1	0		1	0		1	0		0	1	
Total (/3)	3	0		3	0		3	0		2	1	
Navigation (F4) (/8)	6	2		5	3		7	1		3	5	
Media use (F5)												
Static Media (/3)	1	1	0	0	1	1	0	2	0	1	1	0
Continuous Media (/2)	0	0	3	2	1	0	0	0	3	0	0	3
Total (/5)	1	1	3	2	2	1	0	2	3	1	1	3
Interactivity (F6) (/3)	0	3		2	1		2	1		2	1	
Content (for political web sites - F7)												
Scope												
Attract (/16)	2	14		4	12		5	11		7	9	
Inform (/13)	5	8		7	6		7	6		11	2	
Position (/6)	2	4		3	3		1	5		0	6	
Deliver (/6)	0	6		3	3		2	4		1	5	
Accuracy (/1)	1	0		0	1		1	0		1	0	
Authority & Reliability (/3)	3	0		1	2		1	2		1	2	
Uniqueness (/3)	0	3		1	2		0	3		0	3	
Linkages (/4)	3	1		4	0		1	3		2	2	
Text Quality (/3)	2	1		2	1		0	3		2	1	
Total (/55)	18	37		25	30		18	37		25	30	
Grand Total (/85)	**36**	**46**	**3**	**46**	**38**	**1**	**40**	**42**	**3**	**42**	**40**	**3**

All four political web sites have very good design in terms of screen appearance. In general, designers of these sites utilised proper colour, text, titles, headings, and skimming layout. Evaluators identified at least six criteria existence in all web sites from a total of eight generic criteria.

The selected web sites were also benchmarked against three criteria for consistency. Web sites belonging to PAS and DAP were very consistent in all three aspects of page layout, use of text, and navigational aids. The other two web sites (i.e. BN and ABIM), however, suffered from page layout inconsistency such as placement of content display and banners. Apart from page layout, BN's web site also has inconsistent use of text in terms of its types, font size, and colour.

Accessibility is the third category of usability used in the evaluation. Three web sites - BN, PAS, and DAP were highly accessible in both aspects of display compatibility and searching facility. ABIM's web site, however, did not provide any searching function for better accessibility.

DAP's web site has the highest level of usability in navigation category. It met seven out of eight criteria used in the benchmarking. The only problem faced by this site was the non-existence of a site map. BN and PAS also scored fairly well with six and five criteria existence respectively. However, ABIM's web site had major navigation problems including a few broken links, long page scrolling, and unavailability of site map. Consequently, this web site only scored three out of eight.

When benchmarking the criteria for media use, it was found that most of the selected web sites did not utilise continuous media in presenting information excepts PAS. All sites also failed to properly use static media where graphics, logos, and pictures were not labelled.

The selected web sites were also good in some aspects of interactivity. Although features for entertainment were not available, web sites belonging to PAS, DAP, and ABIM provided all features for users' feedback and discussions. BN's web site, on the other hand, had very severe interactivity problems where all three criteria were not utilised.

When benchmarking content criteria, PAS and ABIM performed better than BN and DAP by scoring 25 out of 55 criteria. Both PAS and ABIM had a wider scope of contents especially those that would attract and inform visitors. Despite performing slightly worse than the others in most aspects, BN's web site scored perfectly for content aspect of authority and reliability. Other web sites scored only one out of three criteria in this category. When measuring linkages, PAS web site had all four criteria compared to DAP, which had only one. DAP also suffered severe text quality problems where all three criteria

were not met. The scores in other areas were not much different between the four web sites.

The score for the benchmarking together with the percentage usability index for all four web sites were summarised in figure 11(a) and 11(b).

Figure 7.11 (a): The benchmarking score and percentage web usability index for the selected web sites.

SCANMIC Factors	BN			PAS			DAP			ABIM		
	YES	NO	NA	YES	NO	NA	YES	NO	NA	YES	NO	NA
F1 (/8)	7	1	-	6	2	-	7	1	-	7	1	-
F2 (/3)	1	2	-	3	0	-	3	0	-	2	1	-
F3 (/3)	3	0	-	3	0	-	3	0	-	2	1	-
F4 (/8)	6	2	-	5	3	-	7	1	-	3	5	-
F5 (/5)	1	1	3	2	2	1	0	2	3	1	1	3
F6 (/3)	0	3	-	2	1	-	2	1	-	2	1	-
F7 (/55)	18	37	-	25	30	-	18	37	-	25	30	-
Total (/85)	36	46	3	46	38	1	40	42	3	42	40	3

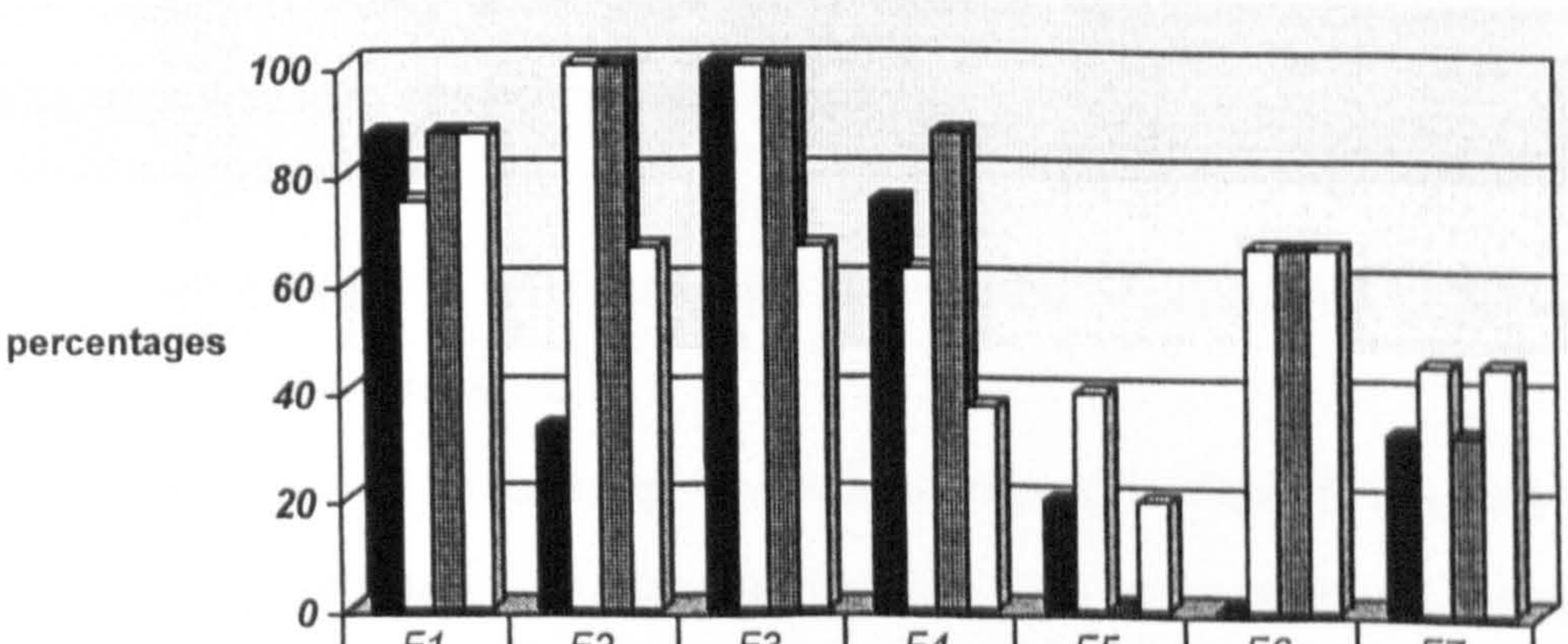
% Usability Index for BN = 36/(85- 3) X 100 = **43.90%**

% Usability Index for PAS = 46/(85-1) X 100 = **54.76%**

% Usability Index for DAP = 40/ (85-3) X 100 = **48.78%**

% Usability Index for ABIM = 42/ (85 - 3) X 100 = **51.23%**

Figure 7.11 (b): Bar Chart of the benchmarking score (in %) for the 4 selected web sites.



	F1	F2	F3	F4	F5	F6	F7
BN	87.5	33.3	100	75	20	0	32.7
PAS	75	100	100	62.5	40	66.6	45.4
DAP	87.5	100	100	87.5	0	66.6	32.7
Abim	87.5	66.6	66.6	37.5	20	66.6	45.4

Step Seven and Eight: Redesign and Monitor Progress

In practise, web benchmarking is normally performed by an organisation by comparing its web site with its competitors. Therefore, the result can be used to make changes for better web sites in terms of usability. However, the benchmarking in this research was only to test the applicability of the framework and not being performed on behalf of any particular organisation. Hence, step seven and eight are not contextually applicable.

Nonetheless, the results of the benchmarking revealed some usability problems faced by all parties as described in step six. In general, the usability level of web site belonging to PAS has the highest level of usability with 54.76 percent, followed by ABIM, DAP, and BN with 51.23 percent, 48.78 percent, 43.90 percent respectively (refer to figure 7.11(a)). The results also provide ideas to designers of all web sites particularly BN and DAP on areas that need to be concentrated on in the redesign of their sites.

7.7.2 Discussion

The benchmarking was conducted successfully with satisfactory results. The benchmarking processes or steps were easily followed and executed by all parties who were involved. Good feedback was obtained from the evaluators. The criteria used were easily understood and evaluated. The number of criteria for all categories was also considered adequate.

Nonetheless, after the testing, several issues were noted which could improve the applicability of the framework:

- The whole process of performing the benchmarking in Step 5 was very time consuming and in some cases, evaluators had to go through every web page in the site to assess a criterion (e.g. clear title for each web page). The task would be even more demanding for a large web site with more than 500 pages. Two solutions are recommended to minimise this problem as follows:
  1) During Step 4 (i.e. identify who will benchmark), select more evaluators (e.g. one evaluator for each SCANMIC category);

2) During Step 5 (i.e. perform the benchmark), instead of evaluating all web pages, allow evaluators to test parts of the web site. For instance, if the site has 5 sub-categories, probably evaluating at least two pages for each category is adequate. Employing a proper sampling technique in selecting the web pages is recommended (e.g. the use of random sampling). This is to ensure that all web pages have equal chances of being selected for evaluation. However, the issue of adequacy is highly subjective and almost always depended on the evaluators.

- One of the evaluators wondered whether this framework could be used on other technologies such as the digital TV and hand held devices (e.g. PDA and mobile phones). This suggests the need for informing the evaluators of the limitation of the framework, which is applicable only on web sites accessed through PC-based and desktop computers.
- The outcome of the testing also revealed that the benchmarking evaluation method needs to be expanded. In particular, Step 7 (i.e. redesign) required enhancement. In addition to relying on the results of Step 6 (i.e. analyse data and determine gap) to redesign the web site for better usability, other evaluation methods (e.g. expert reviews) could also be used particularly those that deal with the assessment of the subjective criteria. Therefore, it should be mentioned in Step 7 that the results of the benchmarking, together with the results of other assessment methods (e.g. expert review, interview and user observation) should be utilised in the redesign process.
- The evaluators suggested that the assessment should be based on both the existence of a particular criterion and its functionality (i.e. whether it works or not). For example, if a web site provides a menu for local search facility, it does not mean that it can help users find information easily. The search function might not work properly or return an error page. Based on this suggestion, Step 5 of the framework should be expanded to include instructions to evaluators that remind them not only to look for criteria existence but in some cases, also identify whether they are indeed working.

Results of the benchmarking indicated that the overall level of usability for the selected web sites was low which ranged between 40 to 55 percent. Although these web sites performed well in areas of screen appearance, consistency,

accessibility, and navigation, they suffered some usability problems in some aspects of media use, interactivity, and most importantly content.

7.8 Conclusions

A framework for measuring the usability of web sites with special focus on political web sites was finally achieved. The framework should be beneficial to individuals or teams with technical or non-technical background, who intend to benchmark the usability of their web sites against those of their competitors or of similar types. It provides step-by-step cyclical processes that should be followed when benchmarking web sites as follows:

- Identify what to benchmark;
- Determine what to measure;
- Identify who to benchmark;
- Identify who will benchmark;
- Perform the benchmark;
- Analyse data and determine gap;
- Redesign, and;
- Monitor progress.

Although there are many aspects of web sites that can be evaluated, the focus of this framework is on usability involving seven general areas of screen appearance, consistency, accessibility, navigation, media use, interactivity, and content. A total of 46 metrics were used for benchmarking general web sites and 85 metrics for benchmarking political web sites. Evaluators can choose whether to benchmark all categories or focus only on certain usability areas. Selecting the evaluators should not be difficult and costly as they could be any competent Internet users who are familiar with the Internet environment and terminology. Forms for the benchmarking with a list of its metrics for each category are also provided.

When performing the benchmarking, the framework proposed on using at least two computers with different specifications mainly in terms of processor,

RAM, Internet bandwidth, and Internet browsers. This is to accommodate the measurements of few criteria particularly those that relate to display compatibility. The results of the benchmarking can be used to determine the gap that exists between the web sites and to identity areas of concerns that need immediate improvements.

The framework was proven to be applicable when it was tested successfully on four political web sites in Malaysia. The processes or steps of the benchmarking were easily followed and executed. The criteria used were easily understood and evaluated. In addition, the completed forms were easily calculated to get the results. However, several weaknesses were identified during the testing which allowed a refinement to the framework.

Apart from the criteria used for the benchmarking, the framework also provides guidelines on other criteria that were considered important by the participants (i.e. Internet users, web developers, and experts) in this research. A total of 20 web usability guidelines were proposed which cover the areas of screen appearance (7), accessibility (1), navigation (4), media use (3), and content (5).

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Chapter Eight

Conclusions and Suggestions

8.1 Introduction

Chapter one discussed the research background including research rationale leading to the formation of research questions and objectives. Chapter two presented the literature review on key concepts of research particularly Cyberdemocracy and web usability, and the formation of web usability model. In chapter three, the research phases and methodologies used to achieve the objectives stated in chapter one, were explained. Chapters four, five, and six presented the data analysis and results of research from phase one (Usability Criteria Elicitation), phase two (Expert Review), phase three (online survey, and interview with the Internet users and web developers) and phase four (Web Content Analysis). The previous chapter (i.e. chapter seven) described the web benchmarking framework and its testing (phase 5 and 6).

In this final chapter the overall findings and outcomes of this research are concluded. It is divided into five sections. First, it describes the outcomes of each research objective. Second, it provides a further synthesis of the overall research findings. Third, it summarises the implications of research on political web site developers and the concept of democracy and Cyberdemocracy. Fourth, it highlights some of the problems faced during the whole process of conducting the research. Finally, it describes the research limitations, suggestions for improvement and future studies.

8.2 Objective Achievements

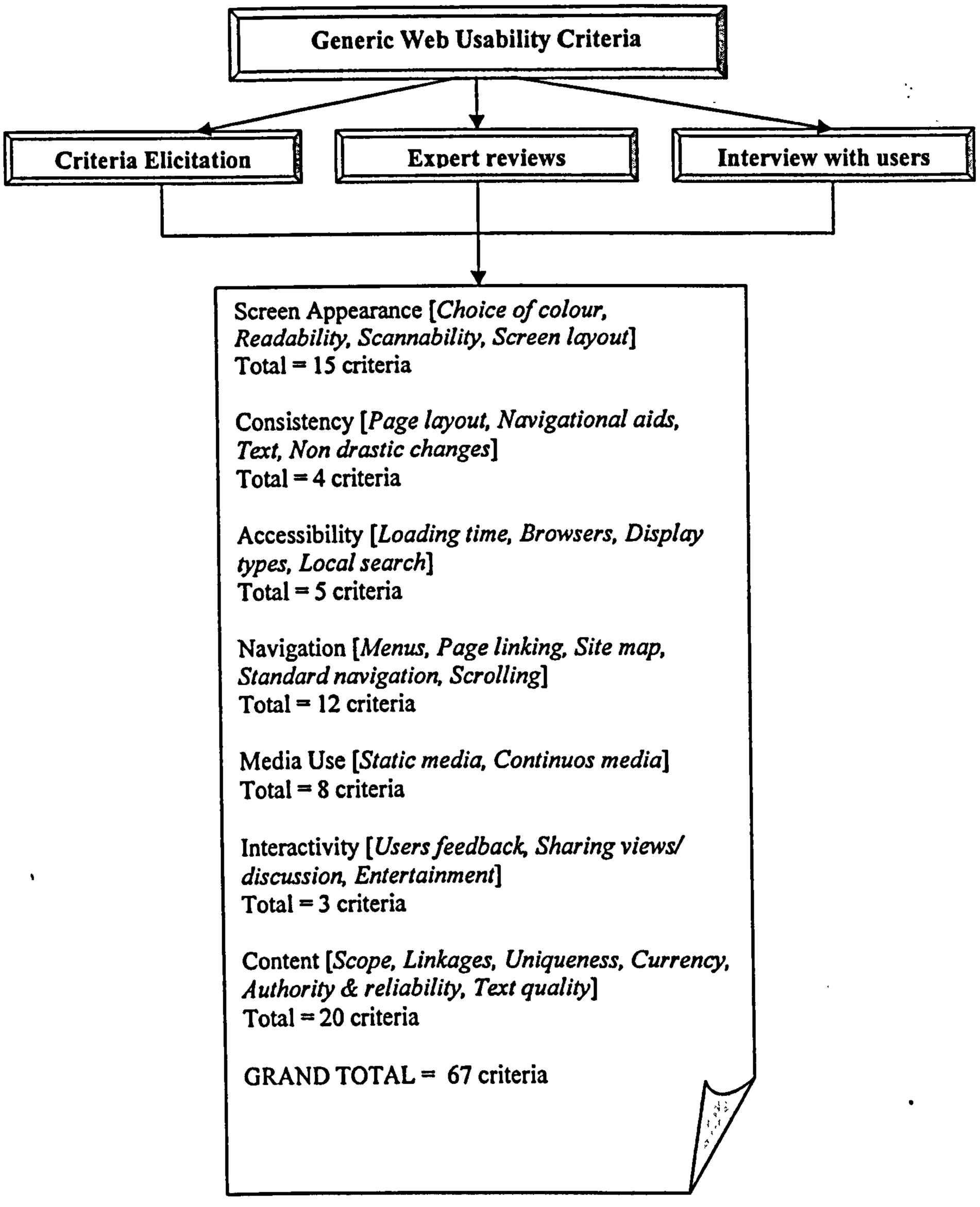
All objectives of this study have been successfully achieved, which can be categorised into:

- Generic criteria of web usability;
- Generic criteria that are applicable to political web sites;
- The Internet users' perception on the importance of generic web usability criteria;
- The development of the web benchmarking framework, and;
- The applicability of the web benchmarking framework.

8.2.1 Generic Criteria Of Web Usability

Altogether a total of sixty-seven web usability criteria (both objective and subjective) were identified. They were grouped into seven main categories: Screen Appearance, Consistency, Accessibility, Navigation, Media Use, Interactivity and Content (i.e. SCANMIC factors) which were derived from the analysis of four web design guides written by Powell (2000), Nielsen (2000), IBM (2000) and Keeker (1997) as explained in chapter two (section 2.5.3). As these factors were very broad, some were broken down into smaller sub-categories. Figure 8.1 summarises the process of identifying generic web usability criteria and its overall findings.

Figure 8.1: The identification of web usability criteria



The criteria for each factor will be explained briefly below.

Criteria for Screen Appearance

Fifteen criteria were identified for Screen Appearance. Four are related to choice of colour for text, background, functional area and content display area. Three are more relevant to readability issues such as choice of fonts, their sizes, and the use of background images. Another five criteria deal with scannability issues which include the need for clear page titles, headings and sub headings, short paragraphs, effective writing style, and

typography and skimming layout. The remaining three criteria are related to screen layout, structure and the allocation of screen space for web page elements.

Criteria for Consistency

Consistency has four key criteria - consistent page layout, consistent use of text in terms of its type, font size and colour, consistent use of navigational aids, and finally avoidance of drastic changes to web pages.

Criteria for Accessibility

Five criteria were identified for Accessibility. They were further classified into three sub-categories - loading speed, displays compatibility, and fast content retrieval. The first criterion concerns with the need for web design that allows fast downloading. Three criteria deal with the provision of contents that are compatible with most browsers, browser versions, and different screen types. The remaining criterion is the use of local search facility.

Criteria for Navigation

Twelve criteria were placed into Navigation category. Three are related to the need for proper menu design and placement within web pages, five concern with accurate and useful page linking, two refer to the avoidance of long page scrolling, and the remaining two are the use of site map and standard navigation aids.

Criteria for Media Use

Media Use has eight key criteria - four for continuos media (i.e. audio, animation, and video) and four for static media (i.e. graphics and images). The criteria for continuos media emphasise the need for web designers to use the media that suit context, provide alternative access and control features to continuos media whenever appropriate, and avoid looping animation. The other four criteria are related to proper and non- excessive use of static media. The media should only be used to enhance the information being presented and they should be labelled. In addition, the

use of thumbnails with the options for larger images is also important in displaying photos.

Criteria for Interactivity

Three criteria were proposed for Interactivity - provision of features for users' feedback about the site, features for sharing views and discussion with other visitors or users, and features for entertainment (e.g. online games and puzzles).

Criteria for Content

There were six sub-categories for Content - Scope, Authority and Reliability, Currency, Uniqueness, Linkages, and Text Quality. Scope has four criteria that are related to the use of suitable language for audience, the need for up-to-date publication, the provision of an archive for previously published material, and finally the provision of content that meets users' expectation.

Three criteria were proposed for Authority and Reliability - the information on authors, the use of references in text, and the availability of web owners' background information (e.g. company logos, name, and address). There was only one criterion for Currency, which highlights the importance of content updating. Four criteria were grouped under Uniqueness, which are the provision of options for output or print format, choices of media types for obtaining information, warnings or reminders before executing users' requests, and give-aways. Linkages have two criteria - clear distinctions between internal and external links and the availability of links to other relevant sites.

The remaining six criteria were placed under Text Quality (previously named Accuracy in the early stage of research). Most of these criteria are related to basic requirements of web writing including high quality writing with no grammatical and typographical errors, passages that are easy to read and understand, clear distinction between informational and opinion

content, and provision of summaries with links to the full text versions. The use of pictures in documents is also recommended.

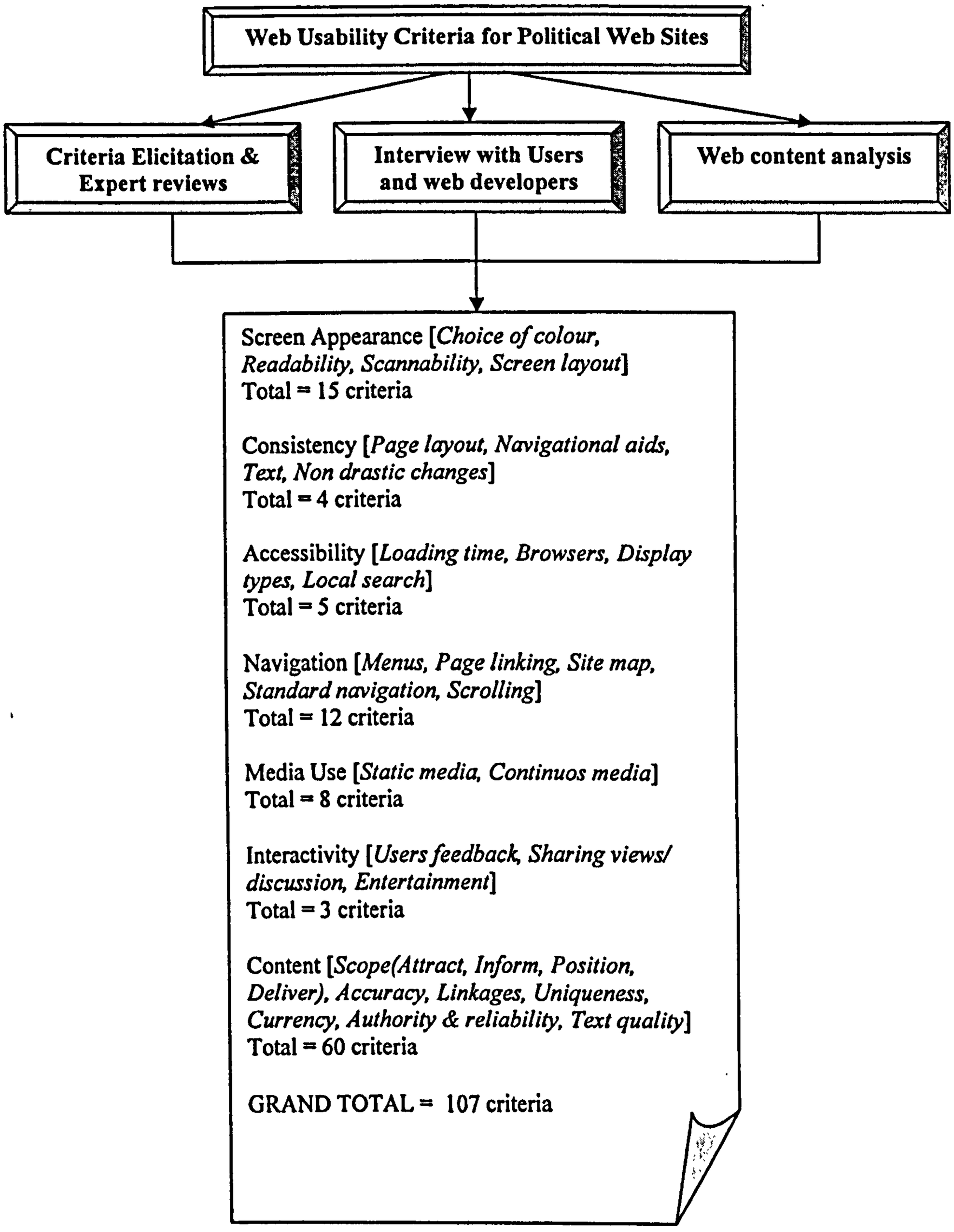
8.2.2 Generic Criteria That Are Applicable To Political Web Sites

Apart from web usability criteria that are applicable to general type of sites, this research also identified the criteria affecting the usability of political web sites. The research findings (i.e. from the interview with the Internet users and political web developers) indicated that most criteria proposed by the participants were generic criteria that were applicable to general type of web sites (e.g. fast page downloading). The main differences were the criteria for Content which are mostly unique to political web sites (refer to chapter 6). This means that all forty- seven criteria for Screen Appearance, Consistency, Accessibility, Navigation, Media Use, and Interactivity were also proposed for measuring political web sites.

The interview and web content analysis (refer to chapter 4 and 6), however, resulted in the identification of sixty web usability criteria for Content that were mostly applicable to political web sites. Scope alone has forty-one criteria which were further categorised into four areas - Attract, Inform, Position, and Delivery (refer to figure 7.4 (b)). The remaining nineteen criteria were similar to those used for measuring general types of web sites where they were classified into sub-categories of Accuracy, Authority and Reliability, Uniqueness, Linkages, and text quality.

The processes of identifying web usability criteria that are specific to political web sites together with its findings are summarised in figure 8.2.

Figure 8.2: The identification of web usability criteria for political web sites



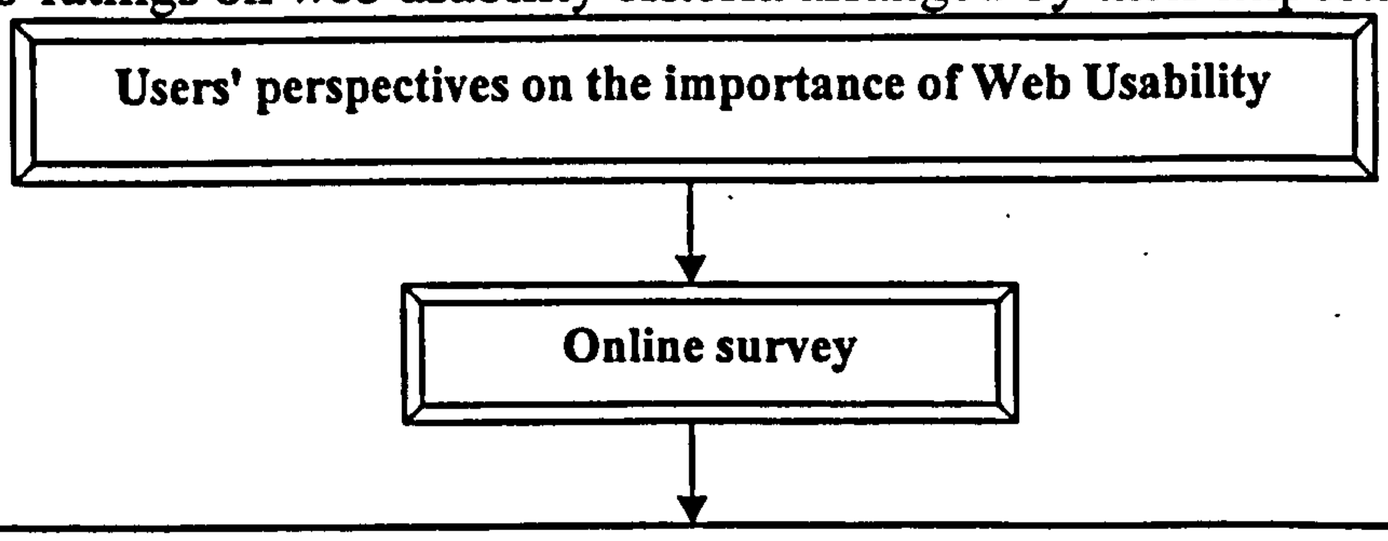
8.2.3 The Internet Users' Perception On The Importance Of Generic Web Usability Criteria

Internet users are the ones, who use and consume information provided by web sites. Considering this, usability should also be viewed from the perspective of users, not only usability experts. Hence, an online survey was conducted to get users' ratings on the importance of web usability criteria identified from the literature search and expert reviews (refer to chapter 5).

In general, the results of the survey showed that the participants regarded most web usability criteria as important in determining web usability. The top ten highest ratings were occupied mostly by Content and Accessibility criteria. The same results were also derived from the interview with the Internet users where criteria for both of these factors particularly fast page loading and content recency were regarded as very important. Nonetheless, few criteria were rated less important by the respondents such as the availability of entertainment features, the use of inverted writing style and choices of media type for particular information (refer to chapter 5). This indicates that not all criteria proposed in the usability literature and the expert reviews, were considered important by web users.

The overall findings of the online survey on are summarised in figure 8.3.

Figure 8.3: Users' ratings on web usability criteria arranged by their importance



Criteria ratings

	Criteria	Category
1	The site's content is reasonably up-to-date	Content
2	Up-to-date publication (e.g. news, articles, working paper)	Content
3	Loading time should be acceptable to users	Accessibility
4	Contents meet the expectations of users	Content
5	Compatible contents for all main browsers	Accessibility
6	Clear headings and sub headings for general text/ document	Screen Appearance
7	Use of passages that are easy to understand	Content
8	Use of fonts that are easy to read	Screen Appearance
9	Main menu/ key categories of contents in the main page	Navigation
10	High quality writing	Content
11	Clear titles for each pages	Screen Appearance
12	Suitable language for audience	Content
13	Accurate/ unbroken links	Accessibility
14	Clear distinction bet. informational and opinion content	Content
15	Different text sizes to differentiate bet. titles, headings & texts	Screen Appearance
16	List of key categories of contents in all sub pages	Navigation
17	Short paragraphs	Screen Appearance
18	The use of local search facility	Accessibility
19	Links to the main page in all sub pages is available	Navigation
20	All listed categories of contents should be meaningful to users	Navigation
21	Sharp colour contrast between text and its background	Screen Appearance
22	Avoidance of looping animation to prevent users' distraction	Media Use
23	Control features for continuous/ time-based media	Media Use
24	Use of colour to differentiate functional area with content display area	Screen Appearance
25	Information or warnings on file type and size for downloading	Content
26	Use of typography and skimming layout	Screen Appearance
27	Non excessive use of colour for text	Screen Appearance
28	Availability of features for users' feedback about the site	Interactivity
29	Small number of steps/ links to arrive at a particular information	Navigation
30	Availability of an archive of previously published materials	Content
31	References or sources of articles & other text documents	Content
32	Consistent use of navigational aids	Consistency
33	Compatible contents between different versions of the same browser	Accessibility
34	Options for output/ print format when appropriate e.g. for long pages	Content
35	Information on authors of articles and other text documents is provided	Content
36	Consistent use of text in terms of its type, font size and colour	Consistency
37	Availability of features for sharing views and discussions	Interactivity
38	Use of thumbnails to display photos with options for large images	Media Use
39	Use of static media to enhance the information being presented	Media Use
40	Consistent page layout, e.g. screen size for content display, banners, and menu bar.	Consistency
41	Clear headings and sub headings for general text/ document	Screen Appearance
42	Non-excessive use of static media in all pages	Media Use
43	Background information of the site's publisher is clearly stated	Content
44	Choices of language for multi-ethnic audience	Content
45	Compatible display for different screen types	Accessibility
46	Labelling of all static media especially those used for menu or icons	Media Use
47	Links to other relevant sites	Content
48	Use of sitemap	Navigation
49	Contents should be grouped into a small number of key categories	Navigation
50	Use of continuos/ time-based media that suit context	Media Use
51	Clear distinctions between internal and external links	Content
52	Alternative access to any information presented through continuos/ time-based media	Media Use
53	Use the inverted pyramid writing style where you start with conclusion	Screen Appearance
54	Choices of media type for a particular information	Content
55	Use the inverted pyramid writing style where you start with conclusion	Screen Appearance
56	Availability of entertainment features	Interactivity

8.2.4 The Development Of The Web Benchmarking Framework

A framework was developed to measure web usability based on the benchmarking approach (refer to chapter 7). The framework provides eight step-by-step processes (i.e. identify what to benchmark, determine what to measure, identify who to benchmark, identify who will benchmark, perform the benchmark, analyse data and determine gap, redesign, and monitor progress) that explain how web benchmarking can be performed. It helps web evaluators in identifying the main weaknesses and strengths of a web site in seven general areas of Screen Appearance, Consistency, Accessibility, Navigation, Media Use, Interactivity, and Content. Additionally, the benchmarking approach also allows web site owners to track the usability level of their competitors.

A total of forty-six objective criteria were used as the metrics for benchmarking general web sites and eighty-five criteria for measuring political web sites. Although the main focus of the benchmarking was on objective criteria, subjective criteria were also presented as general web design guidelines.

8.2.5 The Applicability Of The Web Benchmarking Framework

The benchmarking was tested on major political web sites in Malaysia, which can be considered successful with satisfactory results (refer to chapter 7). The general outcomes of the testing showed that the framework is applicable and practicable. The whole benchmarking processes or steps were easily followed and executed. The feedback from the evaluators who participated in the testing was very positive and it was used to refine the framework. The criteria used for the benchmarking were easily understood and evaluated. The number of criteria for all categories was also considered adequate.

8.3 Synthesis Of Overall Findings

One of the major outcomes of this research is the SCANMIC model that provides:

- main factors affecting web usability;
- generic web usability criteria for each of the factors that are applicable to most web sites types, and;
- web usability criteria for each of the factors that are specific to political web sites.

An added advantage of the SCANMIC model is that it was derived not only from extensive literature review but also from expert review process, survey on the Internet users, and content analysis of the political web sites. The use of these multiple methods provided a highly reliable approach to modelling. As explained earlier in 8.2, seven factors were identified and broken down into smaller sub-categories. These sub-categories together with the web usability criteria were refined at every stage of research (i.e. expert review, survey, and web content analysis) as summarised in table 8.1.

Table 8.1: Statistics for web usability criteria for each factor at each stage of research

Research Stages	SA	CY	A	N	MU	I	CT	Total
Criteria Elicitation	16	3	5	8	11	2	24 (24)	69
Expert Review	12	3	5	8	11	2	24 (24)	56
Survey	15	4	5	12	8	3	20 (50)	67 (97)
Web Content Analysis	15	4	5	12	8	3	20 (60)	67 (107)

Note:
- SA= Screen Appearance, CY= Consistency, A= Accessibility, N= Navigation, MU= Media Use, I= Interactivity, CT= Content
- The figure in () is the number of criteria for political web sites

Additionally, designers of different skills who plan to develop web sites from scratch can utilise the model as it offers a comprehensive guide. More importantly, the model could also benefit political web site developers in providing proper content since it provides extensive coverage on content requirements that can attract many visitors. Moreover, the model also provides information on how to prioritise web content according to one's

strategy (i.e. to attract more visitors, to make the site more informative, to position the site among the best, or to fully utilise the available web technology).

Apart from identifying the factors and criteria of web usability, this research also investigated the relationship between all the factors. In general, it was found that the seven factors are in fact related to each other[1]. From this, it can be generalised that web usability is least likely to be determined by a single factor. In addition, the SCANMIC model was not only dealing with the objective web criteria used in the benchmarking framework but also subjective criteria that can be measured by qualitative methods.

This research has proven that relying on general guidelines or textbooks written by experts alone is not adequate for designing a usable web site. Expectations and needs of the target users should also be taken into consideration. The questionnaire survey on the Internet users indicated that there is a different degree of importance to each of the web criteria. Hence, web designers should prioritise the web criteria during the design process based on the perception of the target users.

Another aspect of the survey worth mentioning is that the participants tend to consider all criteria that make a web site *fast to access, easy to use, and useful* as very important. This justified earlier findings during the usability criteria elicitation and expert review phases where accessibility, ease of use and content usefulness are among the most important issues in web usability.

Although benchmarking approach is mostly used in business, this research proved that it could also be applied to measuring web sites. The cyclical step-by-step web benchmarking framework was proposed and tested for its applicability. Three positive aspects of the framework could be concluded:

[1] The only exception is the relationship between Interactivity and Consistency, which was weak.

- Metrics were proposed as a result from various data gathering techniques including usability criteria elicitation, expert review, survey, and web content analysis;
- The framework was enhanced through the process of refinement (i.e. feedback from the testing), and;
- Both objective and subjective criteria were included as the basis for framework development (i.e. objective criteria as benchmarking metrics and subjective criteria as general guidelines)

Another important aspect of the framework is that it was developed not only for benchmarking political web sites, which was the main focus of this research, but also for measuring general web sites (i.e. all type of web sites). Other advantages include:

- The eight step-by-step processes are cyclical and thus highly relevant to the changing nature of the Internet technology because continuos web sites evaluation has become very important so as to maintain and improve the level of web usability.
- Readers and designers of different skills can employ it in web evaluation initiatives. The instructions, criteria wordings and processes of the benchmarking were designed for both technical and non-technical people (i.e. those who are involved in web evaluation projects).

Many inter-related issues were raised with regards to current Cyberdemocracy efforts in Malaysia as a result of this research. Firstly, the general level of usability of major political web sites in Malaysia is low. Secondly, there are always insufficient funds for developing and maintaining political web site projects. Finally, there is still lack of awareness among public and political leaders on the potentials of the Internet as a political communication medium.

Although no formal study was carried out to identify factors affecting the low usability level among the major political web sites, it could be assumed that it might be related to the second and third issues. When not many

political leaders are aware of the potentials of Cyberdemocracy, less money are allocated to web site projects. When there is lack of funds for maintaining web sites, it usually results in infrequent updating and redesigning of the sites, thus contributing towards the low level of usability.

8.4 Implications Of Research And The SCANMIC Framework

8.4.1 Implications On Web Developers

The SCANMIC framework could benefit both developers of political and non-political web sites. For the former, the framework can be used to develop web contents that could help achieve their main purposes. At least three general purposes of web sites have been identified - to attract visitors, to inform visitors, and to gain or maintain competitive edge.

Attracting visitors and ensuring that they return are usually the main purposes of most political web sites, particularly new political organisations that have just established their presence on the Internet. In dealing with this issue, the framework proposes developers to provide web contents that are:

- unique (e.g. Question and answer with politicians, speakers corner, online shopping, and job advertisement);
- interactive (e.g. readers' comments, online membership, and e-forum), and;
- most importantly free (e.g. free email, web server's space, e-post card, and newsmail).

Another general purpose of political web sites is to provide information to visitors. Since this purpose is too general, the web content will depend on the specific objective of a particular web site. For example, the main objective of a government web site could be to disseminate public information, and this would be achieved by providing content elements such as government policies, green papers, statistical documentation, crime prevention programmes, and parliamentary debates. Another example, a pressure group's priority could be to promote its campaign on a certain issue, so

providing content elements in its web site such as a list of activities, campaign banners, and audio clips of speeches should assist the promotion. In general, the SCANMIC framework proposes many elements of content that can be employed by web developers of any type of political web sites whose main purpose is to inform visitors. It is up to developers to identify any element suitable for their specific objective as exemplified above.

For some political organisations in particular those that have already established their credibility of Internet appearance and managed to get regular visitors, their main purpose could be different. Their focus could be on maintaining or strengthening their position and competitive edge. To achieve this, the SCANMIC framework proposes the provision of contents that are:

- up-to-date (e.g. frequently updated news);
- credible (e.g. high quality text, clear background information of the organisation, track records, and sources of text);
- resourceful (e.g. links to other related sites, technical help), and;
- easy to access (e.g. local search engine, site map).

Proper and efficient use of various web technologies can also help web developers achieve their web sites' objectives. The outcome of this research suggests that political web site developers who have massive budget for web development, maintenance, and evaluation can fully utilise the capability of the latest web technologies such as web TV, web radio, and Net Conferencing to achieve their goals. In addition, web technologies can also help developers to provide dynamic web sites, which are linked to several databases and media archives. The following scenario provides an example of how web technologies can help political web sites to achieve their objectives:

> *ALO is a Non Governmental Organisation in Malaysia whose main mission is to protect animal rights. Its immediate objective is to gain support from the public in its campaign against deer hunting, which is very popular in Malaysia. It needs support to press the government to introduce a new law against deer hunting and create*

awareness among the public on the need to protect animal rights. Recently, this organisation receives a substantive amount of money for web project from a private firm.

In order to achieve its' objective, ALO can fully utilise the capability of current web technologies, as proposed in the framework, in its web content delivery. Some examples are:

- Web TV can be used to televise documentaries on hunting of protected/ extinct animals such as deer,
- Web radio can be used to announce activities of ALO such as a peaceful gathering at a hunting site,
- Online forum (e-forum) can be provided to invite the public to discuss the hunting issue, and;
- Active Server Pages (ASP) or Common Gateway Interface (CGI) can be used to retrieve a database/ media archive that stores large collections of data and media clips on animals.

By utilising these technologies, ALO can provide a dynamic web site and become a virtual one-stop centre for animal rights activists and its supporters.

The SCANMIC framework could also guide non-political web site developers in publishing web sites that are usable and useful for their target audiences. It allows them to assess their strengths and weaknesses in major areas of usability, in particular Accessibility and Content - the two most important factors of usability. The following scenario is an example of how a non-political web site can apply the SCANMIC framework.

A travel agent who has been in business for more than ten years has decided to extend its' service online to compete with other agents who have succeeded in their web projects. The travel agent then published a web site with the purposes of attracting potential customers, maintaining regular customers, and providing online services such as online quotation and booking. After twelve months, no improvement in terms of sales was detected and the web site received very low hits (i.e. low number of visitors). As a result, the web project was seen as a failure.

In this situation, the web designer/s can use the SCANMIC framework to:

- track the overall usability level of the web site, and;
- identify major usability problems that cause the low visits.

By performing the evaluation (and following the proposed step-by-step processes), the company would be able to locate areas of concern that need improvements. For example, the web site may suffer some serious usability flaws in terms of visual appearance (e.g. poor layout and choice of colour), navigation system (e.g. broken links and long scrolling), use of media elements (e.g. too many unnecessary animation clips), and lack of credibility (i.e. many typographical error). All these flaws can be identified easily by performing the evaluation as proposed in the framework. The outcome of the evaluation will then help the designer/s to improve his/her/their web design so that the objectives of the web site can be fulfilled.

8.4.2 Implications On The Concept Of Democracy And Cyberdemocracy

As explained in chapter 2, a democratic political system should allow citizens to enjoy several rights including the rights to voice opinion freely and to possess knowledge (or be informed). This research has found that by using the Internet (in particular, web sites) as a political communication medium, these two rights could be protected. The research findings including the SCANMIC framework provide guidance on web delivery that could guarantee these rights. For example, the framework proposes a political web site to provide at least the information on the organisations' background, policies, mission and vision, campaign, announcement of activities, and publications. In this instance, the citizens at large would not only be able to enjoy the right to be informed but also be able to access the information easily and quickly. Another example is the need for political web site developers to provide the interactivity features such as e-forum/e-discussion and web visitors' comments on key social and political issues. By providing these features, the web sites are promoting the citizens' rights to voice opinion.

This research and the SCANMIC framework also emphasise the importance of accuracy of information presented on web sites. Another aspect of democracy that is equally important is that people are not only entitled for public information, but also accurate public information. Several criteria are found to be important to achieve this including unbiased content and truthful news.

This research has also justified the claim that Cyberdemocracy (i.e. the use of web sites as political communication medium) has potentials to contribute towards improving the democratic process. Firstly, the claim that Cyberdemocracy provides a direct link between citizen and political leaders. This research (from the web content analysis) found that several political organisations provided some content elements in their web sites that can establish the link, for example, question and answer with politicians and politicians' email addresses. Secondly, the claim that Cyberdemocracy offers citizens the easiest and fastest medium for political information retrieval. From the interview survey, it was found that most political web site users generally agreed to the fact that the Internet does indeed offer the easiest and fastest medium for assessing political information.

From this argument, Rheingold's theory that Cyberdemocracy has widened the concept of public sphere by allowing more people to participate in politics is proven, to a certain extent, to be justified.

However, this research has also identified some issues, apart from usability, which can impede the success of Cyberdemocracy, for example, Internet accessibility and IT literacy. The main aim of Cyberdemocracy efforts is to invite people to get involved in politics through the Internet. However, not many people can get access to the Internet especially in the less developed nations. In Malaysia for example, only about two million people have the Internet access compare to about twelve million adult populations[2].

[2] Statistics provided by CommeceNet.com at http//www.commercenet.com on 12th June 2002

Similarly, the research also found that (from the survey) the Internet is being accessed mostly by educated and IT literate people (i.e. at least, first-degree holders who have been using the Internet for more than 3 years). This suggests that the issue of Internet accessibility and IT literacy could impede Cyberdemocracy initiatives.

Although the effectiveness of Cyberdemocracy efforts is still debatable, the outcome of this research has shown that web usability is indeed a very important aspect that could improve Cyberdemocracy. Political web sites that are easy to use (in terms of navigation), simple (in term of screen appearance and presentation), informative and interactive (in terms of contents) could generally determine a high level of usability. High level of usability could then attract many Internet users to exercise their political rights by visiting political web sites, and thereby improve Cyberdemocracy.

8.5 Research Problems

Although the choice of research methods was based on their suitability with the research objective, there were problems that cannot be avoided. During the usability criteria elicitation process, a few problems were encountered. Analysing web design guides and other selected literature during stage 1 was very difficult and time consuming, partly due to fact that some criteria were:

- described by using technical terms that were not understood by lay persons, thus had to be rephrased;
- too general that needed some elaboration;
- too specific that needed to be generalised, and;
- phrased differently by different authors, thus thorough analysis was required to remove redundancy.

In addition, placing each criterion into the right category was proven to be equally difficult. To verify the results of the criteria elicitation that suffered these limitations, the usability list was sent to experts for comments and verifications.

Conducting the expert reviews was also an uphill task. Firstly, it was very difficult to get participation. Secondly, most experts took very long time to reply

when contacted. Finally, the data from the reviews were *difficult to analyse* primarily because of the different views and suggestions from the experts. Hence, the analysis was made based only on general agreements by the majority of the experts.

A few difficulties were also encountered when performing the online survey. Firstly, it was very time consuming to identify email groups' addresses and URLs of e-forum that are related to politics. Secondly, there were some technical difficulties related to the design of the online form particularly in terms of browser compatibility and form processing. Finally, the response was low for the first two weeks where only about fifty people replied. Follow-up invitations were sent to potential respondents to ask for more participation, which finally resulted in responses from a total of 170 Internet users. Nonetheless, using online survey was proven to be faster and cheaper than conventional mail questionnaire. All replies were received by the web server and processed immediately.

Similarly, a few obstacles were encountered when conducting the interview and web content analysis. Firstly, arranging (or rearranging) appointments with the interview participants were very costly and tedious. Secondly, analysing the data from the interview was a very difficult job due to its qualitative nature. The main difficulty was to isolate a criterion that was described differently by different participants. Finally, placing criteria into the right AIPD category was not easy. In particular, some of the criteria were considered related to more than one category.

8.6 Research Limitations and Suggestions for Improvements

A number of limitations could be deduced. First, the metrics used for the benchmarking were derived partly from the reviews and comments from only fifteen experts. Although this figure can be considered adequate for qualitative research, the results could be different (perhaps improve) should more experts were willing to contribute. Nonetheless, time factor had hindered the process of

getting more experts' participation. Apart from the experts, the web criteria were also partly gathered from the interview survey with only forty frequent Internet users. Once again, time and budget factors had prevented more participants from contributing. As a suggestion, future studies should increase the number of participants thus adding the power of generalising the results.

The benchmarking framework can be further improved if a computerised tool is developed to assist the benchmarking process. The current framework requires evaluators to fill in the form manually while assessing the web site. Therefore, the immediate continuation that ought to be undertaken is to develop the computerised benchmarking tool, which should assist the benchmarking process.

It should be noted that this research only deals with web usability issues relating to web sites that are accessed through PC-based and desktop computers. This means that the framework cannot be applied to measuring or benchmarking web sites that are accessed through other technologies such as Digital Television (DTV), Personal Digital Assistant (PDA), and mobile phones. The framework, therefore, should be enhanced in the near future to make it more widely applicable. As a suggestion, there is an immediate necessity to develop a framework for small displays especially the mobile phone as the device has become extremely popular and widely used (Brewster & Dunlop, 2000), thus could be assumed as one of the best Cyberdemocracy medium.

The online survey and interview were performed only in Malaysian environment. The perceptions and preference of the Internet users on web usability might differ from one country to another mainly due to cultural factor. Hence, one potential study in the future is to perform similar research in other countries or environment. Perhaps, new criteria would emerge relative to the cultural differences. Then, future comparative studies could be conducted providing insights into cultural issues.

This research also focussed only on how the usability of political web sites can be improved. The higher the level of web usability may result in more

participation from the public in politics. However, the issue of the Internet accessibility (i.e. not many people have the Internet access) that may result in unequal participation among the Malaysian population was not considered because it was beyond the scope of this research. However, the research identified that most of the participants in the online questionnaire were highly educated (i.e. at least they are first degree holders). This suggests that the Internet has not yet reached a wider population, as it should be, thus raising the issue of whether the Internet in particular accessing through the desktop computers can really improve democracy. Hence, further studies should be carried out to address such issues.

The framework was tested for its applicability only on political web sites, although it can also be used to benchmark other type of web sites. Therefore, further investigation should be directed at testing the applicability of the framework on other types of web sites especially educational and business sites. In addition, the framework only deals with the objective criteria as the benchmarking metrics. The subjective criteria, on the other hand, are only included as general guidelines and no specific information is given on how these criteria can be evaluated. Evaluating subjective criteria thus calls for further studies.

Another shortcoming of this research is due to the rapid changes in the Internet and computer technology, which has widened the gap of computer specification and Internet access capability of the past with the present. This development has major impact on web usability because different web users own computers with different specifications and Internet access capability. Although this research focussed only on generic criteria taking into consideration the changing nature of the Internet and computer technology, there are possibilities that some of the criteria might not be applicable in future. Hence, studies on criteria that affect web usability should be carried out from time to time.

Finally, this research tackled only the usability issues of web sites particularly political web sites. Other factors could be equally important that could contribute towards a web success. The findings of the interview with political

web site developers, for example, indicated that factors such as financial support, IT infrastructure, manpower, IT expertise, and culture could also play key roles in contributing towards the success of implementing Cyberdemocracy. This indirectly reveals some potentials future studies in the area of the Internet and politics.

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Appendix I

TOWARDS CYBERDEMOCRACY

An Online Survey

Survey Title: Internet Users' Perception on Web Usability with specific focus on political web sites.

Your Chance To Win Free Gift

This page is reserved for online survey purposes. Your help in filling out the questionnaire is highly appreciated. You not only contribute towards research in web usability and cyberdemocracy, but also eligable to enter my **Lucky Draw**. This means that **if your ID number comes up, your will receive a surprise gift from Scotland** either in forms of T-Shirt/ football jersey/ key chains/ fridge magnet/ pen/ pencil etc.

English version.

Versi Bahasa Malaysia.

This is a survey on the Internet users' perception of web usability issues with the main focus on political web sites. Usability has become one of the key factors in determining a web site's success. However, web designers sometimes overlook on this issue by only relying on web design guides without giving much emphasis on the need of the real users.

This questionnaire contains a list of usability criteria derived from the literature, and verified by some usability experts. The users would then rate the importance of each criterion. Part of the result of this survey will be the ratings of all usability criteria by the Internet users.

Your feedback will contribute towards research in the area of web usability particularly in the area of politics on the web.

IMPORTANT: If you have never visited any political sites such as those belonging to political parties, pressure groups or NGO, and government or private agencies in Malaysia, please do so at this link: **link to political web sites**

Thank you.

Shahizan Hassan,
Doctoral Researcher
University of Strathclyde, Glasgow, Scotland

This page was published at URL
http://www.mansci.strath.ac.uk/cyberdemocracy/survey.html from February 2001 until July 2001

A Survey of Users' Perceptions On Web Usability

Part A

Part A contains questions on your backgrounds. Please answer all questions by ticking ☑ in the appropriate box. All answers will be strictly kept confidential and used for research purposes only.

1. What is your sex?

   ☐Male ☐Female

2. What is your age range?

   ☐18-29 ☐30-39 ☐40-49 ☐50-59 ☐60 or over

3. What is your highest qualification?

   ☐SPM and Lower ☐ Diplomas ☐Bachelor Degree ☐Masters Degree
   ☐PhD

4. Please specify your job status:

   ☐employed ☐ unemployed ☐student

5. What is your knowledge/specialised/ study area?

   ☐Social Science ☐Engineering
   ☐Pure Science ☐Computer Science
   ☐Information technology
   ☐Others

6. What is the type of computer you use?

   ☐486 and lower ☐Pentium
   ☐Pentium II ☐Pentium III

7. Please specify type of main browser and its version you normally use:

   ☐Netscape - Version_____
   ☐Explorer - Version_____
   ☐Other

8. Please tick the type of your Internet connection:

   ☐Modem ☐Local Area Network

9. How long have you been using the Internet?

   ☐1 year or less ☐ 2-3 years ☐more than 3 years

10. How do you rate the frequency of your Internet usage?

    ☐always (everyday) ☐seldom (several times a week) ☐occasionally (several times a month)

11. Have you ever visited at least one political web site in Malaysia:

    ☐yes ☐no

(Note:if "yes", please proceed to question 12, else, please click the submit button)

12. How do you rate the frequency of your visit to political web sites:

☐always (everyday) ☐seldom (several times a week) ☐occasionally (several times a month)

Part B

Part B contains questions that reflect your opinion on the *importance* of design elements within web pages. All these elements are recommendations from most guidelines for designing usable web sites. In your own opinion, *please rate ☑ each of these elements in terms of their importance that you think might affect your usage of web sites particularly political web sites*. A 5 scale-rating used in this questionnaire is as follows:

1= Very important, 2=important, 3=unsure, 4=Not important, 5=Not at all important.

Screen Appearance

1. More space is allocated for contents than to other display elements e.g. menu bar, list of contents, and advertisement	☐1	☐2	☐3	☐4	☐5
2. Non excessive us of colour for text	☐1	☐2	☐3	☐4	☐5
3. Sharp colour contrast between text and its background	☐1	☐2	☐3	☐4	☐5
4. Use of colour to differentiate functional area (e.g. tool bar, menu bar and list of contents) with content display area	☐1	☐2	☐3	☐4	☐5
5. Use of fonts that are easy to read, for example, Ariel, Times New Roman and Verdana	☐1	☐2	☐3	☐4	☐5
6. Different text sizes to differentiate between titles, headings and texts	☐1	☐2	☐3	☐4	☐5
7. Background images in the content area is avoided	☐1	☐2	☐3	☐4	☐5
8. Clear titles for each pages	☐1	☐2	☐3	☐4	☐5
9. Clear headings, sub headings for general text/ document	☐1	☐2	☐3	☐4	☐5
10. Short paragraphs (use short sentences and limit a paragraph to only one idea)	☐1	☐2	☐3	☐4	☐5
11.Use of typography and skimming layout, for example, bold fonts and highlighted words	☐1	☐2	☐3	☐4	☐5
12.Use if inverted pyramid writing style (normally practised by journalists) where you start from a conclusion	☐1	☐2	☐3	☐4	☐5

Content

1. contents covered in a web site should meet the expectations of users	☐1	☐2	☐3	☐4	☐5
2. language used is suitable for audience	☐1	☐2	☐3	☐4	☐5
3. Up-to-date publication (e.g. news, articles etc.)	☐1	☐2	☐3	☐4	☐5
4. Availability of an archive of previously published materials	☐1	☐2	☐3	☐4	☐5
5. High quality writing, for example, good grammar and no spelling and typographical error	☐1	☐2	☐3	☐4	☐5
6. Clear distinction between informational and opinion content	☐1	☐2	☐3	☐4	☐5
7. Use of passages that are easy to understand	☐1	☐2	☐3	☐4	☐5
8. Information of authors of articles and other text documents is provided (e.g. names and affiliations)	☐1	☐2	☐3	☐4	☐5

9. References or sources of articles and other text documents are provided	☐1	☐2	☐3	☐4	☐5
10. Background information of the site's publisher(site's owner) is clearly stated i.e. logo, name, address, phone number and email address	☐1	☐2	☐3	☐4	☐5
11. The site should be reasonably up to date (provide resource date page revision date)	☐1	☐2	☐3	☐4	☐5
12. Options for output/ print format when appropriate (e.g. long pages)	☐1	☐2	☐3	☐4	☐5
13. Choices of language for multi-ethnic audience	☐1	☐2	☐3	☐4	☐5
14. Choices of media type for a particular information, for example, text only, audio or video	☐1	☐2	☐3	☐4	☐5
15. Information or warnings on file type and size for downloading	☐1	☐2	☐3	☐4	☐5
16. Clear distinctions between internal and external links	☐1	☐2	☐3	☐4	☐5
17. Links to other relevant sites (e.g. state, branches, sponsors)	☐1	☐2	☐3	☐4	☐5
Accessibility					
1. Loading time for all web pages should be acceptable (normally between 10 – 20 seconds depending on the page contents)	☐1	☐2	☐3	☐4	☐5
2. Compatible contents for all main browsers (e.g. Netscape and Microsoft Explorer)	☐1	☐2	☐3	☐4	☐5
3. Compatible contents between different versions of the same browser	☐1	☐2	☐3	☐4	☐5
4. Compatible display for different screen types (e.g. black & white, palm top, digital TV)	☐1	☐2	☐3	☐4	☐5
5. The use of search facility (especially for medium and large web site i.e. a site with more than 500 pages) that can help users find information	☐1	☐2	☐3	☐4	☐5
Navigation					
1. Main menu/ list of key categories of contents in the main page is provided	☐1	☐2	☐3	☐4	☐5
2. Links to the main page in all sub pages is available	☐1	☐2	☐3	☐4	☐5
3. List of key categories of contents in all sub pages so that users do not have to go back to the main page to browse other pages	☐1	☐2	☐3	☐4	☐5
4. All listed categories should be meaningful to users	☐1	☐2	☐3	☐4	☐5
5. Contents should be grouped into a small number of key categories (normally about 5, plus minus 2)	☐1	☐2	☐3	☐4	☐5
6. Small number of steps/ links to arrive at a particular information (rule of thumb is 3)	☐1	☐2	☐3	☐4	☐5
7. Accurate/ unbroken links					
8.Use of sitemap	☐1	☐2	☐3	☐4	☐5
Media Use	☐1	☐2	☐3	☐4	☐5
1.Use of continuos/ time-based media (audio, animation and video) to suit context, for example,	☐1	☐2	☐3	☐4	☐5

demonstration, instruction, speeches, and songs.					
2.Alternative access to any information presented through continuos/ time-based media (audio, animation and video)	☐1	☐2	☐3	☐4	☐5
3.Avoidance of looping animation to prevent users' distraction.	☐1	☐2	☐3	☐4	☐5
4. Control features for continuos/ time-based media e.g. turn off, replay	☐1	☐2	☐3	☐4	☐5
5. Use of static media (graphics and images) to enhance the information being presented	☐1	☐2	☐3	☐4	☐5
6.Non-excessive use of static media (graphics and images) in all pages	☐1	☐2	☐3	☐4	☐5
7.Labelling of all static media (graphics and images)	☐1	☐2	☐3	☐4	☐5
8.Use of thumbnails to display photos with the option available to see a large image.	☐1	☐2	☐3	☐4	☐5
Interactivity					
1.Availability of features for users' feedback about the site, for example, web master's email address and on-line form.	☐1	☐2	☐3	☐4	☐5
2. Availability of features for sharing views and discussions, for example, e-forum, net conference and net chatting	☐1	☐2	☐3	☐4	☐5
3. Availability of entertainment features e.g. online games7. Clear distinction between informational and opinion content	☐1	☐2	☐3	☐4	☐5

End of Questionnaire

submit

TOWARDS CYBERDEMOCRACY

Links To Political Web Sites in Malaysia

Selected political web Sites in Malaysia/ Laman web politik terpilih di Malaysia

Partisan sites:

United Malays National Organization (www.umno.org.my)

Malaysian Chinese Association (www.mca.org.my)

Malaysian Indian Congress (www.mic.org.my)

Pan-Malaysian Islamic Party (www.parti-pas.org)

Keadilan (www.keadilan.org)

DAP (www.malaysia.net/dap)

Malaysian People's Party-PRM (www.partirakyat.org)

NGOs/ pressure groups:

Suruhanjaya Hak Asasi Manusia Malaysia (SUHAKAM) (Malaysian Human Rights Commission)

Suara Rakyat Malaysia (SUARAM) (Voice of the Malaysian People)

Aliran Kesedaran Negara (ALIRAN) (National Consciousness Movement)

Federation of Malaysian Consumers Associations (FOMCA)

Consumers Association of Penang (CAP)

Malaysian Trade Unions Congress (MTUC)

Angkatan Belia Islam Malaysia (ABIM) (Malaysian Muslim Youth Movement)

Persatuan Kebangsaan Pelajar Islam Malaysia (PKPIM) (Malaysian Muslim Students National Association)

Online News Agencies:

Malaysiakini (www.malaysiakini.com)

Harakahdaily (www.harakahdaily.com)

FreeMalaysia (www.freemalaysia.com)

Wawasan Merdeka (http://www.umno.org.my/wawasan/index.html)

Bottom of Form 2

Appendix II

List of Reviewers for Criteria Classification (Subjective & Objective) and Web Content Analysis

1. Mrs Norshuhada Shiratuddin
   Lecturer in Multimedia Technology and Applications for more than 7 years at the Northern University of Malaysia. Has vast experience in multimedia research, published a few books and journal papers, and presented papers at least once twice a year in international conferences.
2. Mr Jalil Desa
   Senior Engineer at MIMOS, the pioneer of Internet Service Provider in Malaysia. Headed the Networking research team at this company for several years before pursuing his PhD at Strathclyde University.
3. Shahizan Hassan (also the author)
   Lecturer in Information Systems and Management at the Northern University of Malaysia for more than 5 years. Involved in several major Information Technology projects including database and multimedia application development.

Appendix III

List of User Interface Design and Human-computer Interaction Experts: (Names of experts in bold letters are those who participate)

1. Awre, A. Senior Info Architect, Creative Services (andreas@cellnetwork.no)
2. Berkun, S. UI Design Manager, Microsoft (scottber@microsoft.com)
3. Berman, A. Senior human Factors Specialist (aberman@tisny.com)
4. Black, M. M. Info Architect (melinda@ink.org)
5. Bollaert, J. Usability Architect, Compuware Digital Development Center (Jodi_Bollaert@compuware.com)
6. Bratton, B Senior Info Architect, Creative Services (Bbratton@IXL.com)
7. **Connel, I.** PhD, experienced HCI researcher, University of York (iain_connel@hotmail.com)
8. **Coventry, L.** University consultant, NCR Strategic Solutions Group (lynnco@exchange.Scotland.NCR.COM)
9. **Czerwinski, M.** PhD. Usability Manager, Microsoft's Interactive Media Division (marycz@microsoft.com)
10. **Deaton, M.** Architect for User-Experience, WebCT (mdeaton@tidemark.com)
11. **Dunca, R.A.** Usability Specialist, TechTarget.com, USA (rdunca@techtarget.com)
12. Fuller, R. Info Architect, Knowledge Strategies Group (rfuller@kstrat.com)
13. **Gray, P.** Lecturer, Computing Science Dept, University of Glasgow (pdg@dcs.gla.ac.uk)
14. Hairston, M. User Interface Designer, WebCT (michael.hairston@webct.com)
15. **Hendry, D.** Human Factors Lead, E-Generis (dhenry@avaya.com)
16. Hess, S.M. User-Experience Designer, Open Market (stephen.hess@openmarket.com)
17. **Ingwersen, P.** Profesor, PHD, Dept of Information Studies, Royal School of library and Information Science, Denmark
18. Instone, K. Research Associate at Computer Science Dpt. Bowling Green State University, Webmaster for HCI conference 199501996 (instone@cs.bgsu.edu)

19. **Jamaluddin, Z.** Lecturer, Northern University of Malaysia (zulie@uum.edu.my)
20. Jordaan, F. Designer, Pres. Co. London (francois.jordaan@pres.co.uk)
21. **Landoni, M.** PhD, Lecturer, Dept of Information Science, University of Strathclyde (landoni@dis.strath.ac.uk)
22. Mourier, M. Usability Architect, Icon Medialab, Denmark (mai@iconmedialab.dk)
23. Mountford, S,J. Manager, Human Interface Group, Apple Computer (mountford@interval.com)
24. Nielsen, J. PhD, Sun Microsystem, dintinguished system engineer (jacob@eng.sun.com)
25. Norman, D. PhD, Famous HCI researcher with several well-established HCI books. (don@jnd.org)
26. **Orril, J.** Chief Design consultant, Transparent Media (Jason@transparentmedia.com)
27. **Scheid, K.** Web site usability expert/ usability engineer, Webcriteria.Com
28. **Shiratuddin, M.F.** Web designer/ lecturer, Northern University of Malaysia (fairuz@uum.edu.my)
29. Shneiderman, B. PhD, HCI-Laboratory, Dept of Computer Science University of Maryland (ben@cs.umd.edu)
30. Stover, A. Info Architect, eConsultancy (astover@arc.com)
31. **Suki, A.** Lecturer, Northern University of Malaysia (suki1207@uum.edu.my)
32. Tognazzini, B. Experienced web designer (tog@healtheon.com)
33. **Weir, G.** PhD, Lecturer, Computer Science Dept, University of Strathclyde (gw@cs.strath.ac.uk)
34. Wells, P. Info Architect, StoreRunner Inc. (pweels@san.rr.com)
35. Williamson, A. CEO, WebCriteria (alistair@webcriteria.com)

Appendix IV

E-mail invitation to potential expert reviewers

Department of Management Science,
University of Strathclyde,
40 George Street, Glasgow
G1 1QE Scotland

<Date>

Dear <receiver>,

Invitation to participate in an expert review of web usability criteria

Part of my PhD research is to develop a framework (for non-technical people/designers) on how to evaluate the overall usability of political web sites. To achieve this, I need to identify the generic usability criteria that can be used for web evaluation.

With this in mind, I would like to invite you as an expert to review and validate the list of key generic web usability criteria as attached with this email. The list is also published online at http://www.mansci.strath.ac.uk/shahizan/review/index.htm. The objective and subjective criteria provided in the list are those that I gathered from the literature (text books, web design guides, journal articles etc).

If you are willing to contribute, please review the list or visit the site mentioned above and feel free to give your comment (add, edit or delete any criteria) by sending me an email at shahizan@mansci.strath.ac.uk . Please bear in mind that any suggested criteria should be generic in nature and easily understood by non-technical people.

You are also kindly requested to provide a very brief summary of your biography containing information about your current work, affiliations, company's address, and length of service or experience so that I can put it in my report's acknowledgement.

Your cooperation and willingness to participate in this research is highly appreciated.

Thank you.

Sincerely,

Shahizan Hassan
Supervisor: Dr Feng Li

Expert Review on Web Usability Criteria[1]

Part A: Cover letter

1) Introduction to research

What I intend to do for my PhD research is to develop a framework (for non-technical people/designers) on how to evaluate the usability of political web sites. To achieve this, I need to identify the generic usability criteria that can be used for web evaluation.

From my literature review, I have identified about **68 key generic criteria** that are grouped into seven main categories/ factors i.e. screen design, navigation, content, media use, interactivity, consistency, and accessibility. The next step in this research is to get a panel of experts in Human Computer Interaction/ User Interface Design/ Information Retrieval/ Information System Development to **verify** the list of the identified criteria.

2) Instructions to reviewers

a) As an expert, you are requested to carefully read and review the attached usability list. You can **add, edit or delete** any criteria or groupings whenever necessary. Please use closed-brackets '()' for any suggested corrections, additions and comment. Please bear in mind that any suggested criteria should be generic in nature and easily understood by non-technical people.

b) After reviewing, please email me or send this file back to me at this address: shahizan@mansci.strath.ac.uk.

c) Please provide a very brief summary of your **biography** containing information about your current work, affiliations, company's address, and length of service or experience so that I can put it in my report's acknowledgement.

3) Statement of appreciation

My supervisor, Dr. Feng Li, and I would like to express our gratitude for your willingness to participate in this study. We strongly believe that your contribution will be beneficial for this research. A summary of revised list of web usability and a letter of appreciation from the Director of Research, the Department of Management Science, will be sent to you as soon as I receive a feedback from you.

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[1] Also published at http://www.mansci.strath.ac.uk/shahizan/review/index.htm

Part B: Web Usability List

Web Usability Criteria

1. Screen Design

1.1 Space Allocation

- Proper allocation of screen spaces for display elements e.g. content, menu bar, list of contents, and advertisement
- Position of menu/ list of contents on screen (left or right hand site of the screen)
- Location of menu bar/ tools bar/ navigation bar (at the top or bottom of the screen)

1.2 Choice of Colour

- Minimal use of colour except for photos and graphics
- Sharp colour contrast between background and foreground
- Use of colour to differentiate functional area (e.g. tool bar, menu bar and list of contents) with content display area
- Use of conservative colour
- Use of light colour (white/yellow) colour for background

1.3 Readability

- Use of fonts that are easy to read
- Use a mixture of upper and lower case for text
- Use of all capital letters for captions and labels
- Different text sizes to differentiate between titles, headings and texts

1.4 Scannability

- Clear titles for each pages
- Clear headings, sub headings for text/ document
- Short paragraphs (not more than 6 sentences)
- Use of typography and skimming layout, for example, bold fonts and highlighted words

2. Content

2.1 Scope

- Breadth of subject coverage
- Depth of subject coverage
- Intrinsic value of information
- Suitable language for audience
- Publication and press release
- Archive of previously published materials

2.2 Accuracy

- High quality writing, for example, good grammar and no spelling and typographical error
- Separation between informational and opinion content

2.3 Authority

- Name of text or documents' authors
- Positions or affiliations of text or documents' authors
- References or sources of text/ document
- Background information of institution/ organisation/ owner of the site i.e. name, address, phone number and email address
- Copyright holder statement

2.4 Currency

- Resource date
- Page revision date

2.5 Uniqueness

- Output/ print format as alternative to HTML format
- Viewing format other than HTML, for example, PDF and slides
- Choices of language for multi-ethnic audience

- Choices of media type for information, for example, text only, audio or video
- Hit counter
- Information or warnings on file type and size for downloading

2.6 Linkages

- Links to other relevant sites
- Links to state and local branches
- Links to supporting or sponsoring organisations

3. Accessibility

3.1 Loading Speed

- Acceptable loading time (10 – 20 seconds)

3.2 Browser Compatibility

- Compatible contents for all main browsers (Netscape and Microsoft Explorer)
- Compatible contents between different versions of the same browser

3.3 Search Facility

- Necessary for medium and large web sites

3.4 Web Site Accessibility

- Links available in other relevant web sites

4. Navigation

- Menu/ list of contents in the main page
- Menu/ list of contents in every page
- Links to anywhere from anywhere within the site
- Appropriate number of sections/ categories of contents (not more than 7)
- Minimal number of links to arrive at a particular information
- Use of both graphics and text-based menu
- Accurate and up-to-date links
- Use of sitemap

5. Media Use

5.1 Audio

- Use of audio to suit context, for example, instruction, speeches, and songs
- Control features for audio where appropriate , for example, replay, control volume and turn off

5.2 Graphics and Images

- Use of graphics or/and images for emphasis
- Use of graphics or/and images to attract attention
- Minimal use of cosmetic graphics and images
- Labelling of all graphics and images
- Use of thumbnails to display photos

5.3 Animation and video

- Use of animation and video as guides to users
- Relevant use of moving pictures media i.e. animation and video
- Control features for animation and video where appropriate, for example, repeat, slow down, turn off
- Avoidance of looping animation to prevent users' distraction

6. Interactivity

- Features for users' feedback about the site, for example, web master's email address and on-line form
- Features for sharing views and discussions, for example, e-forum, net conference and net chatting

7. Consistency

- Consistent page layout, for example, screen size for content display, banners, and menu bar.
- Consistent use of text in terms of its type, font size and colour.
- Consistent use of navigational aids, for example, menu bar, buttons and links in terms of graphics metaphor, size and colour.

--End of document--

Appendix V

List of participants in the Interview of the Internet Users

Name	Occupation
1. Ms Juliana Ahmad	Web Master
2. Ms Suariyati Hamid	College student
3. Ms Musliha Hamid	Data operator
4. Ms Maslita Mohamad	Administrative Staff
5. Mr Hashim Johar	Teacher
6. Mr Jazlan Musa	Teacher
7. Mr Muhamad Al Fatih	University student
8. Mr Mohd Amarullah	University student
9. Mr Izuan Isa	University student
10. Mr Syamsul Anuar	University student
11. Mr Mohd Shiham	University student
12. Mr Mohd Shaed Supian	Programmer
13. Mrs Mohd Shaed	Teacher
14. Mr Ismail Abd Manaf	Teacher
15. Mrs Ismail	Housewife
16. Mr Azlan Zainol Abidin	Lecturer
17. Mr Rashdi Mokhtar	System Analyst
18. Ms Syahreena Yaacob	Designer
19. Ms Haniza Khalid	Teacher
20. Mr Mohd Mahadhir Latiff	Librarian
21. Ms Suriyati Hanim	Personnel staff
22. Ms Yuslina Yaacob	Personnel staff
23. Mr Mohd Kamaruddin Mohd Noor	Politician
24. Mr Ashwin Ramalingam	Cybercafe owner
25. Ms Y (refused to be named)	Teacher
26. Mr Hazman Haron	Religious teacher
27. Mr Rahman Ismail	Businessmen
28. Ms Sabrina	College student
29. Mr Kamil Idris	Lecturer

30 Ms Salwa Hamid	Cybercafe staff
31. Mr Azrul Hashimi Zabidi	System analyst
32. Mr Mohd Nuri Al Amin Endut	Lecturer
33. Mr Ramzi Zakaria	Politician
34. Mr Mohd Jasni	Politician
35. Mr Mohd Asri	Teacher
36. Mrs Shuhada Shiratuddin	Researcher
37. Mr Roslan Salleh	Politician
38. Mr Abdul Halim Ahmad	Lecturer
39. Mr Ishak Bakar	Businessman
40. Mr Mirzat Awang	Businessman

Appendix VI

Interview with Internet Users in Malaysia

Questions

A: Biography

- What is your name?_____
- What is your sex? _____
- What is your age range: below 20, 20-30, 31-40, 41-50, above 50?
- What is your highest qualification? _____

B: General Information

- How long have you been using the Internet? What for?
- What is the frequency of your Internet usage: daily, several times a week, several times a month?
- Why do you visit a particular web site?
- Which type of web site you normally visit?
- Have you ever visited political web site? Why?

- How do you rate the frequency of your visit to political web sites: daily, several times a week, several times a month?

C: Specific Information

- How do you differentiate between good web site and bad web site? What about political web sites?

- What kind of problems you face when visiting a web site? What about political web sites?

- What are the content elements that attract you to visit a web site regularly? What about political web site?

- What are the design elements that help you find information within a web site easily?

- Do you think Internet can be an effective medium for politics? Why?

End of form.

Appendix VII

Interview with Internet Users in Malaysia (summary)

Data analysis form

A: Biography

- What is your sex?

Male = 26, female = 14, Total = 40

- What is your age range:below 20, 20-30, 31-40, 41-50, above 50?

<20 = 0, 20-30= 24, 31-40 = 13, 41 – 50 = 3, >50 = 0

- What is your highest qualification?

High school diplomas/ lower = 22
1st degree = 23
Masters degree = 5
PhD = 0

B: General Information

- How long have you been using the Internet?

<= 1 year = 1, 1-3 years = 19, > 3 years = 30

What for?

1. email = 40
2. chatting = 23
3. file transfer/ download = 20
4. WWW = 40
5. conferencing (audio/ video) = 1

- What is the frequency of your Internet usage: daily, several times a week, several times a month?

Daily = 22, several t/week = 14, several t/month = 4

- Why do you visit a particular web site?

1. search information for projects/ work needs = 17
2. read news = 26
3. download files = 11
4. as a hobby = 4
5. making friends = 1
6. personal interests = 2

- Which type of web site you normally visit?

1. education = 22
2. edutainment = 1
3. entertainment = 6
4. news = 22
5. government = 1
6. politics = 13
7. e-commerce/banking = 2
8. personal sites = 2
9. sports = 2
10. kiosks/ portal = 4

- Have you ever visited political web site?

Yes = 40

Why?

1. Read political news faster and cheaper = 3
2. read news coverage on politics from the perspective of both government and opposition parties = 9
3. follow current political development = 16
4. to get reliable political news not available in traditional media = 6
5. to get up-to-date political news not available in traditional media = 6
6. to know opposition's views on current issues = 4
7. for educational purposes e.g. essays = 1
8. to be conscious of political issues internally and internationally = 1

- How do you rate the frequency of your visit to political web sites: daily, several times a week, several times a month?

Daily = 14
Several t/week = 15
Several t/month = 11

C: Specific Information

- How do you differentiate between good web site and bad web site? What about political web sites?

1. fast loading especially main page = 5
2. reliable content that reflects the truth = 11
3. good screen structure = 4
4. unbroken links = 2
5. good authors/ writers = 1
6. trustworthiness = 1
7. local search facility = 1
8. regularly updated especially news = 9
9. e-forum = 1
10. free downloadable files (inc. audio and video) = 1
11. news not covered in traditional news media = 3
12. feel welcome = 2
13. informative = 1
14. user-friendly = 2
15. links to other related topics = 1
16. no slandering/ attacks on individuals = 3
17. simple layout = 3
18. pictorial news = 2
19. un-bias content = 5
20. less advertisement = 1
21. proper groupings of contents = 1
22. fact-based news = 1
23. explain certain issues in detail = 1
24. the way information is presented = 2
25. users comments = 1
26. provide views from both opposition and ruling party = 1
27. bulleted points, not paragraph = 1

- What kind of problems you face when visiting a web site? What about political web sites?

1. long loading =18
2. broken links = 16
3. too many banners = 8
4. lost within the site = 4
5. network connection problem = 14
6. poor choice of colour = 6
7. too much animated graphics = 3
8. no warning for external links = 1
9. long scrolling = 4
10. inaccurate news headings = 1
11. poor navigation = 1
12. cover the same issue all the time = 5
13. pop-up windows = 6
14. site structure non-conformance to standards = 2
15. too much advertisement than facts = 1
16. too structured = 1
17. unattractive = 1
18. repetitive issues = 1
19. too much campaign than motivational facts = 1
20. too much rubbish news = 2
21. irrelevant graphics = 3

22. cramped/ crowded pages = 2
23. unstructured pages = 2
24. too many menus = 3
25. get plug-in message = 1
26. outdated content = 1
27. under construction pages = 1
28. change of address/ URL = 1

- What are the content elements that attract you to visit a web site regularly? What about political web site?

1. accurate title for news/ stories/ information =7
2. short summary of articles= 2
3. variety of information medium used= 6
4. attractive headings= 4
5. name of author=2
6. links to related contents=4
7. provide non political contents as well=7
8. news arranged to recency=2
9. up to date contents especially news=15
10. proper grouping of contents=3
11. good writing style=2
12. links to established web sites=2
13. background music that can be controlled=5
14. news with pictures=10
15. more interactive (user response & feedback)=5
16. relevant graphics (static/ animated)=5
17. news coverage of various issues=7
18. dialogue/ QA with politicians/ public figures=3
19. links to political news on neigbouring countries=2
20. religious corner e.g. reminder, surmons=2
21. archive of previous news release=1
22. feed back from users that are replied by web masters=1
23. simple language=1
24. start article with conclusion=1
25. summary of news/ articles with links to full versions=10
26. reliable information=6
27. entertainment features e.g. games=2
28. history of parties =1
29. history of country=1
30. commentary section on hot issues=2
31. news not available in conventional media=4
32. polling on certain issues=1
33. sources of news/ articles=1
34. forum=1
35. humour=1
36. chatting=1
37. e-card=1
38. free email=1
39. accurate news headers=9
40. list of activities/ programs=1
41. readers' comments=1
42. no slandering=1
43. fair reporting=2
44. divide news according to scope e.g. local & international=5
45. separation between past and & latest news=1
46. short paragraph=1
47. choice of language=1

- What are the design elements that help you find information within a web site easily?

1. proper choice of colour = 13

2. list of key categories of contents = 8
3. proper groupings of contents = 8
4. standard navigation (menu location, buttons etc.) = 7
5. archive searching (news, articles etc) = 5
6. less scrolling = 5
7. conservative colour (not too bright) = 4
8. simple layout = 3
9. local search facility = 3
10. graphic menus with text labels = 3
11. accurate links = 3
12. change appearance occasionally but not too drastic = 2
13. text links within text so that users can explore if they wanted to know more=2
14. chunk information = 2
15. scanning features (italic, bold etc) = 2
16. well structured screen = 1
17. no scrolling = 1
18. site map menu on every page = 1
19. proper choice of words for categories = 1
20. proper font size for text = 1
21. information on files to be downloaded = 1
22. provide thumbnails for photos = 1
23. design consistency = 1
24. design for speed = 1
25. news with links to other related news = 1
26. menus fit on screen (no menu scrolling) = 1
27. less instruction = 1

Appendix VIII

List of Participants in the Survey with Political Web Site Developers

Organisation	Representative
1. Angkatan Belia Islam Malaysia (ABIM)	Mr Shahran Kasim Mr Nizar Shukor
2. United Malay National Organisation (UMNO Online)	Mr Shariff Hamid
3. Democratic Action Party (DAP)	WebMaster (refused to be named)
4. Malaysian Chinese Association (MCA)	Ms Hanna Chan, Mr Mok Ah Hoo
5. Malaysian Pan Islamic Party (PAS)	Mr Iszeham, Mr Jamali, Mr Razain

Appendix IX

Summary of Data from the Interview Survey with Political Web Site Developers

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1. What is the goal of your web site?

DAP:

- To distribute DAP's messages to all Malaysians wherever they are

ABIM:

- To provide information to all the public about ABIM

MCA:

- To explore new means of disseminating information

UMNO:

- To provide real & transparent information to the public and members about development of parties and current political issues

PAS:

- To disseminate information to public and members about PAS and its activities

2. What are the main objectives of your web site?

DAP

- To convey messages directly to people without restrictions
- To explain/ answer national issues with regards to DAP's stands
- To promote good relationship between visitors and party/ politicians
- To get feedback from people about DAP

ABIM

- To disseminate press release/ news so that people get first hand news directly from ABIM
- To announce activities of ABIM to the public and members

MCA

- To disseminate information that is difficult to get it from the traditional print media

UMNO

- To issue press statement on-time before news
- To debate issues with opposition
- To correct false news by opposition
- To become a reference centre

PAS

- To provide answers and responds to current issues and confusion among the public
- To provide articles related to certain issues
- To provide news update daily to supplement conventional newspaper

3. What are your strategies to achieve the objectives?

DAP
- Regular updating
- Immediate response to hot issues
- Advertise URL in all official publications, email list and news groups.

ABIM
- Promotion of the site (submit URLs to search engines, distribute leaflets)
- Up-to-date press release
- Making the announcement of all activities a priority

MCA
- Put up the latest news
- Competition (party related)

UMNO
- Promotion of the site (cybercafe during UMNO conference, stickers, advertisements in newspaper, letterheads)
- Free email
- e-groups
- contest

PAS
- Set-up IT department
- Get a recognition from top leaders on the importance of the Internet
- Promotion (advertisement in newspaper, advertisement in e-forum, announcement in public lecture/ forum

4. Do you think you have achieved your objectives so far, if NOT, what will you do next?

DAP
- So far so good but difficult to assess success

ABIM
- Partly yes, especially press release but difficult to know the overall success due to lack of user feedbacks
- MCA
- Visitors' number is increasing but not to expectations
- People still do not get used to getting information from the Internet

UMNO
- Hits is improving since changed to interactive site
- Partly achieved but a lot to be done

PAS
- A lot to be done - hits still low
- Visitors visit only during seasons
- Accessibility issues - not many people get access to the Internet
- Server capability - still could not support rising number of visitors
- Lack of contents

5. Who provides financial support for your site?

DAP
- By party itself

ABIM
- By organisation itself

MCA
- By party itself

UMNO
- By party itself

PAS
- Mostly by donation from individuals

6. How many people involve in developing and maintaining your site?

DAP
- 1 manager and 3 webmasters for 3 languages (malay, chinese and english)

ABIM
- I designer, 1 maintainer, 2 content providers

MCA
- Design done by outside company
- Content and maintenance done by IT unit led by 1 full time staff

UMNO
- Design done by outside company
- Content and maintenance done by e-umno team (1 manager, 1 designer, 1 inputer)
- Articles contributed by university students, journalist and volunteers.

PAS
- Done by IT department (1 full-time manager and 5 volunteers)

7. What are the major problems faced during the development and maintenance of your site?

DAP
- Getting first hand sources of information
- Lack of technical knowledge in web design

ABIM
- Lack of funds
- Content updating is difficult because content providers are too busy with other work

MCA
- Content updating is very challenging and time consuming
- Too much work not related to web design and maintenance

UMNO
- Budget is too small for web design and maintenance
- Lack of technology (computers and peripherals)

PAS
- Getting the sources from the leadership

8. How long it takes to publish your site for the first time?

DAP

3 months

ABIM

Very short tome - less than a month

MCA

Can't remember

UMNO
1 and half week
PAS
Don't know - all members are new

9. Do you perform any usability testing on your site before publishing it?
DAP
- no

ABIM
- No - lack of fund

MCA
- Yes but only internal by members of the team

UMNO
- No - no expertise

PAS
- No - lack of time and funds

10. Do you use any web design guides or reference for developing your web site?
DAP
- No, only advice from the professionals

ABIM
- Yes, plus help from friends and previous knowledge

MCA
- Design done by the specialist, so don't know.

UMNO
- Some text books and follow good web sites

PAS
- No, only use own knowledge

11. Do you receive any feedback from visitors regarding the design and content usefulness of your sites? If yes, what are your actions to this?
DAP
- Yes, used for updating and redesign

ABIM
- Yes, collected for future web projects. Most users are asking for more interactive features

MCA
- Yes, used for redesign process. Most users are asking for more interactive features

UMNO
- Yes, used for redesign

PAS
- Yes, used for future web project. Most users ask for faster versions with less graphics and animations.

12. What is your future plan for your web site?
DAP
- Provide even better site that can convey information more effective
- Provide more features to attract visitors

ABIM

- To include more contents as follows:
- Discussion forum
- Shopping mall
- Promotion for Malay enterprises

MCA

- Make it more interactive e.g. internet polls, search engines
- Make it more informative

UMNO

- Include chat service
- Service oriented e.g. online registration
- e-forum
- real time events

PAS

- Create a portal web site with more interactive features, fast access, more linkages especially to branches and associates

13. Do you think the Internet is effective as a political communication medium?

DAP

- Yes, due to restriction on the main media (printed media) and high level of IT awareness among the public

ABIM

- Yes because people are looking for alternative and cheaper medium to follow political issues than traditional medium e.g. newspaper.

MCA

- Yes, it is the fastest medium for disseminating information

UMNO

- Yes, so far it has been the best communication medium i.e. easy and fast delivery

PAS

- Yes, especially in Malaysian environment due to strict restriction of media

Appendix X

Codes for Web Usability Criteria listed in Part B of Online Questionnaire

Screen Appearance

Code	Criteria
S1	More space is allocated for contents than to other display elements (e.g. menu bar, list of contents, and advertisement)
S2	Non excessive use of colour for text
S3	Sharp colour contrast between text and its background.
S4	Use of colour to differentiate functional area (e.g. tool bar, menu bar and list of contents) with content display area.
S5	Use of fonts that are easy to read (e.g. for example, Ariel and Times New Roman)
S6	Different text sizes to differentiate between titles, headings and texts.
S7	Background images in the content area should be avoided.
S8	Clear titles for each pages.
S9	Clear headings and sub headings for general text/ document.
S10	Short paragraphs (use short sentences and limit a paragraph to only one idea).
S11	Use of typography and skimming layout (e.g. for example, bold fonts and highlighted words).
S12	Use the inverted pyramid writing style (normally practised by journalists) where you start with conclusion.

Contents

Code	Criteria
C1	Contents covered in a web site should meet the expectations of users.
C2	Language used is suitable for audience.
C3	Up-to-date publication (e.g. news, articles, working paper etc.).
C4	Availability of an archive of previously published materials.
C5	High quality writing (e.g. good grammar and no spelling and typographical error).
C6	Clear distinction between informational and opinion content.
C7	Use of passages that are easy to understand.
C8	Information on authors of articles and other text documents is provided (e.g. names and affiliations).
C9	References or sources of articles and other text documents are provided.
C10	Background information of the site's publisher(site's owner) is clearly stated (e.g. logo, name, address, phone number and email address).
C11	The site content should be reasonably up-to-date (provide resource date & page revision date for users)
C12	Options for output/ print format when appropriate (e.g. for long pages).
C13	Choices of language for multi-ethnic audience
C14	Choices of media type for a particular information (e.g. text only, audio or video)
C15	Information or warnings on file type and size for downloading
C16	Clear distinctions between internal (links within a site) and external links (links to other sites)
C17	Links to other relevant sites (e.g. state, branches, sponsors)

Accessibility

Code	Criteria
A1	Loading time for all web pages should be acceptable (normally about 10 - 20 seconds depending on the contents of the page).
A2	Compatible contents for all main browsers (e.g. Netscape and Microsoft Explorer).
A3	Compatible contents between different versions of the same browser.
A4	Compatible display for different screen types (e.g. black and white, palm top and digital television)
A5	The use of local search facility (especially for medium and large web site) that can help users find information quickly.

Navigation

Code	Criteria
N1	Main menu/ list of key categories of contents in the main page is provided
N2	Links to the main page in all sub pages is available
N3	List of key categories of contents in all sub pages so that users do not have to go back to the main page to

	browse other pages.
N4	All listed categories of contents should be meaningful to users
N5	Contents should be grouped into a small number of key categories (between 5-7 [or 7 plus minus 2] is recommended)
N6	Small number of steps/ links to arrive at a particular information (rule of thumb is 3)
N7	Accurate/ unbroken links.
N8	Use of sitemap.

Media Use

Code	Criteria
M1	Use of continuos/ time-based media (audio, animation and video) to suit context, for example, demonstration, instruction, speeches, and songs.
M2	Alternative access to any information presented through continuos/ time-based media (audio, animation and video)
M3	Avoidance of looping animation to prevent users' distraction
M4	Control features for continuous/ time-based media (e.g. to turn off and replay)
M5	Use of static media (graphics and images) to enhance the information being presented
M6	Non-excessive use of static media (graphics and images) in all pages
M7	Labelling of all static media (graphics and images) especially those used for menu or icons
M8	Use of thumbnails to display photos with the option available to see a large image.

Interactivity

I1	Availability of features for users' feedback about the site (e.g. web master's email address and on-line form)
I2	Availability of features for sharing views and discussions (e.g. e-forum and net conference)
I3	Availability of entertainment features(e.g. online games)

Consistency

Code	Criteria
T1	Consistent page layout (e.g. screen size for content display, banners, and menu bar).
T2	Consistent use of text in terms of its type, font size and colour
T3	Consistent use of navigational aids, (e.g. menu bar, buttons and links in terms of graphics metaphor, size and colour)

Appendix XI

List of Web Sites Selected for Review

Malaysia

- http://www.malaysia.net/aliran/ (ALIRAN)
- http://www.malaysiakini.com (MALAYSIAKINI)
- http://www.umno.org.my (United Malayan National Organization -UMNO)
- http://www.pas.org.my (Pan Islamic Party of Malaysia -PAS)
- http://www.dap.org.my (Democratic Action Party -DAP)
- http://www.harakah-daily.com (Opposition Political newspaper)
- http://www.mca.org.my (Malaysian Chinese Association)

United States

- http://www.democrats.org (Democrats)
- http://www.rnc.org (Republican party)
- http://www.americanreform.org (American Reform party)
- http://socialist.org/base.html (Socialist party)
- http://www.greens.org (Green party)

United Kingdom

- http://www.labour.org.uk (labour party)
- http://www.snp.org.uk (Scottish National Party)
- http://www.scottishtories.org.uk (Scottish Conservative)
- http://www.green.org.uk (Green party)

Australia

- http://www.democrats.org.au (Democrats)
- http://www.alp.org.au (labour party)
- http://www.liberal.org.au (Liberal party)
- http://www.greens.org.au (the green party)