CHAPTER 4

EVALUATION CRITERIA: GENERAL GUIDELINES AND PRINCIPLES FOR THE DEVELOPMENT OF WEBSITES

1. INTRODUCTION

As with any other medium, the criteria for quality will vary with the genre and the goals of the website. The first step in the identification of assessment criteria for the evaluation of *SA Government Online* involved the compilation of a criteria list that may have universal applicability or the development and evaluation of websites (see chapter two). This chapter reviews these criteria.

General principles and guidelines for each criterion are discussed briefly. As it is not the purpose of this study to present a detailed guide for web publishing, it was not deemed necessary to present a complete and detailed discussion of the principles and guidelines, and only the more prominent aspects will be highlighted. A consolidated list of the criteria with more detailed indicators for each is presented in paragraph seven.

2. CONTENT AND SCOPE CRITERIA

According to Sullivan (1997), information content on a website represents its "base" value and is a primary concern for websites. Rettig & LaGuardia (1999:54) state: "Content is king – if the content does not serve the audience's need no amount of clever graphics or cool animations will make up for this deficiency."

Content criteria are concerned with what the website actually contains. Content for a website should be selected with a discerning mindset to ensure that information is valid, accurate, current, comprehensive and come from authoritative sources.

2.1 Orientation to the website

2.1.1 Overview of the website

Smith (1997) states that users might find it difficult to evaluate the authority of websites when information on scope and authority is not made available. Scope notes or information

about the producers should be provided, and it must be possible to establish the purpose for which the website was designed. A scope note should state what information is included in the website. This includes:

- Breadth, i.e. the aspects of the subject that are covered.
- Depth, i.e. level of detail provided about the subject
- Format. A site that provides links may restrict its scope to certain classes of resources (Smith, 1997).

2.1.2 Copyright and disclaimer statements

When relevant, copyright and disclaimer statements should be provided on the website. Neale & McCombe (1997) recommend that copyright symbols be used in the footer instead of in every file and that it should contain date, symbol and organisation name.

2.2 Authority of the website

Authority in print material is frozen in time with the information. However, this is not relevant for online information. Care should be taken to ensure that users would be able to determine the authority of the website, especially for information that is expected to change often or is time-sensitive.

2.2.1 Indication of the publisher/official support/sponsorship

A good website should identify itself in terms of where it comes from. The sponsor, producer or owner of the site should be indicated to enable the user to establish the website's credibility and reliability (Rettig & LaGuardia, 1999:54), to determine the reputation, qualifications and objectivity of the host institution (Patterson, 1997), to evaluate the kind of documents he/she is reading (Kirk, 2000), and to get a quick indication of what the likely goals of the website are and what contents to expect (Shneiderman, 1997). Users will thus be able to determine if the organisation is recognised in the specific field of publishing, is legitimate and is suitable to address the topic at hand. It is worth noting that Brandt (1996) reasons that when a web document is written and/or issued by an authoritative source such as the government, it is generally accepted at face value as having validity.

Information should be provided about the organisation's experience or qualifications with regard to the development of the specific website. There should also be a phone number or

postal address to enable users to contact the organisation for more information (Rettig & LaGuardia, 1999:51).

The information about the official body responsible for the website should be readily available. Lynch & Horton (1997) recommend that all pages on the site contain such information. In addition, internal evidence should make it clear to the user that pages and documents are part of an official site, for example in headers, footers or by providing a distinctive watermark. If the organisation is not immediately recognisable, information about the organisation should be provided somewhere else on the site (Rettig & LaGuardia, 1999:54). Lynch & Horton (1997) recommend the incorporation of the "home" URL on at least the main pages of the site, as it is a way of maintaining the connection to where a page originated. Once the user has saved the page as a text file or printed the page onto paper this connection may be lost.

2.2.2 Indication of authorship

According to Patterson (1997), an author's qualifications might constitute a strong indication of the reliability of the information that he/she presents. Users therefore should be able to determine if an author is qualified to write on a particular subject. In addition, users want to know the people behind information on the website: "Biographies and photographs of the authors help to make the web a less impersonal place and increase trust" (Nielsen, 1999e).

A site should therefore enable the user to easily find out about the authors, where they work, what their credentials are that make it appropriate for them to write about the topic, and how to get in touch with them for further questions (Schrock, 1998).

2.2.3 Inclusion of bibliographies and references

Some information on websites originates from sources such as books, journal articles and other types of publications. There should be adequate citations to these sources to confirm the accuracy of the information and to determine the origin of documents. This will strengthen the credibility of the information presented on the website and will provide users with more information about the topic. However, it is generally accepted that information about the organisation itself is reliable, and thus does not need to cite authors (Harris, 1997; Caywood, 1997).

2.2.4 Reliability of information

According to Harris (1997), information serves as the basis for beliefs, decisions, choices and understanding our world, and "if we make a decision based on wrong or unreliable information, we have no power". Evidence of authenticity, reliability, credibility, and believability of information on the website is therefore important. Information should be factually correct, up to date, detailed, exact and comprehensive.

Previous issues as discussed in this paragraph can also determine reliability. For example, information will be reliable when written by an author who has experience with a subject or cites research from well-known authorities (Norem, 1998).

2.3 Comprehensiveness/information coverage/scope

2.3.1 Breadth, depth and amount of information

Smith (1997) describes this criterion as that which "determines what items are included in a website and if the actual scope of the site matches expectations". It includes:

- Breadth. Aspects of the subject that are covered, also including if the site focuses on a narrow area or also includes related topics.
- Depth. The level of detail provided about the subject and if it relates to the audience for which the website has been designed.
- If a site which provides links restricts its scope to certain classes of resources.

Rettig & LaGuardia (1999:54) specify that a website's content should be "germane to the topic", broad enough and deep enough to meet the audience's needs. It should also be fully described, for example via a scope note. Harris (1997) acknowledges the fact that it is almost impossible to include all information on a particular subject on a website, but states that a source that deliberately omits important facts or alternatives may be misleading.

2.3.2 Selection of links to external sites

According to Smith (1997), a distinction can be made between sites that only provide links to other resources and those that provide original information. He regards it as similar to Katz's distinction between control-access-directional sources (for example indexing and abstracting services or bibliographies) and source-type works (like encyclopaedias and fact books).

Websites can be useful both as information resources in themselves and as links to other information. Smith (1997) warns, however, that "lists of resources that look promising, but simply contain more links" could frustrate users. In addition, if the value of the site lies in its links to other sources, the links should be made to appropriate resources and always be kept updated. Links must also be presented in such a way that it is clear that an external site is being referred to.

2.3.3 Unique information content

A website should offer unique information content and not simply duplicate information in other mediums or from other websites. If the content is also available in other forms, the web documents should have the features of the original, but value should be added, for example by means of improved currency or access, providing updates to the printed source or additional features.

2.4 Currency and timeliness

2.4.1 Frequency of updating and maintaining the website

When users need current information on a topic, it is important for them to find resources that include the most recent information on that topic. It is thus important that information is regularly updated. A general guideline is that the update frequency should be appropriate to the subject matter (Rettig & LaGuardia, 1999:54).

Even if information is added regularly, the site should contain the most current information (updating of pages may not necessarily guarantee currency of information). Time-sensitive information, such as announcements of events, should be available in real-time (Kirk, 2000; Lynch & Horton, 1997).

Lynch & Horton (1997) state that the presence of new information should be obvious to users. One method is to put a "New" graphic next to each updated item on the menu pages. However, if the site is complex, with many levels of information spread over many pages, it is preferred to create a "What's New" page that is specifically designed for this purpose.

2.4.2 Indication of currency

Kirk (2000) states that a user should always be able to determine when the site was last updated. Therefore, to alert the user to the currency of the information, she recommends that every web page be dated with its creation or publication date, and that the date be changed whenever the page is updated ('last updated' date). Rettig and LaGuardia (1999:54) add that a good website should explain the degree and nature of the most recent updating.

Where there is a need to add data or update documents on a continuous basis, Levine (1995) recommends that clues be provided about what information would be updated and what the update frequency is. This is especially important when static and dynamic data are being mixed, as well as for long or complex online documents that are updated regularly, but may not look different enough to indicate a change in content to less frequent users.

2.4.3 Durability of information

Some information is timeless, other has a limited useful life, and some gets outdated very quickly. The website manager should therefore be careful to ensure that only information that is useful is kept on the site (Harris, 1997). This does not mean that older information should not be available on a website: "Old information is often good information and can be useful" (Nielsen, 1999e). It is, however, important that this information should always be valid.

Another requirement for the durability of information is that links to other sites be kept live or be removed.

2.5 Objectivity and fairness

Kirk (2000) reasons that information is rarely neutral. "Because data is used in selective ways to form information, it generally represents a point of view"; when a user finds information on the site, he/she will examine who is providing the information and what may be their point of view or bias.

Despite the fact that there is no such thing as pure objectivity, a good writing style should avoid biases. Harris (1997) regards conflict of interest as one of the biggest hindrances to

objectivity, as a website might sometimes benefit in some way (financially or politically) if the user accepts certain information rather than the objective truth.

In addition, information presented on websites should be fair, moderate and consistent (Harris, 1997). Fairness includes a balanced, reasoned argument that is not selected or slanted. Even ideas or claims made by the source's opponents should be presented in an accurate manner. A good website will also have a calm, reasoned tone, arguing or presenting information thoughtfully and without attempting to get the user emotionally worked up or inflame feelings (Harris, 1997).

2.6 Writing and editorial style

Gahran (1998) states that text is the basic building block of the web, as it plays a key role in terms of a site's content as well as in internal and external navigation schemes and user orientation.

2.6.1 Basic rules of literary composition

The bulk of content on the web is text. Quality of writing is therefore important for the content to be communicated clearly. According to Smith (1997), conventional guidelines include the careful organisation of information, use of topic sentences, limitation of each paragraph to one main idea, and providing the right amount of information. In addition, information should be free of grammatical, spelling and other typographical errors. Smith (1997) regards these kinds of errors as a lack of quality control, and also believes that it can actually produce inaccuracies in information.

Gahran (1998) considers it more effective to use shorter sentences and paragraphs on the web, as it is easier on the eyes and works particularly well for sites that display text in thinner columns. This also makes it easier to "chunk" content, so that users are presented with digestible and navigable sections of content rather than "an unbroken river of text" (Gahran, 1998).

Nielsen (1993:123) recommends that websites "speak the users' language". He recommends that terminology used be expressed in words, phrases and concepts familiar to the user and have standard meanings. In addition, dialogue should be in the user's native language as far as possible. The latter issue should also include nonverbal elements like icons.

According to Story (1999), consistency throughout the site is a key issue – users should not have to wonder whether different words, situations or actions mean the same thing. Web writers should determine a standard writing style and keep to it. Story (1999) suggests the use of a standard dictionary to assist with this.

2.6.2 Concise writing style

According to Lynch & Horton (1997) users experience web pages in two ways: as a medium where pages can be read online, and as a delivery medium to access information that is later downloaded into text files or printed paper.

Documents to be read online must be concise and structured for fast scanning. Lynch & Horton (1997) reason that the "inverted pyramid" style used in journalism also works well on web pages. Important facts should be at the beginning of the first paragraph where users can find them quickly. According to Morkes & Nielsen (1997), other elements that enhance scanning include headings, large type, bold text, highlighted text, bulleted lists, graphics, captions, topic sentences and tables of contents. In the case of longer documents, concise writing is still preferred, but Lynch & Horton (1997) recommend not to "dumb down what you have to say".

Gahran (1998) agrees that tight writing is an advantage. She recommends that passive voice and prepositional phrases be avoided, but at the same time, there must be sensitivity to tone and flow. Copy should not be edited so tightly that it becomes choppy and abrupt, as this will interfere with readability. Furthermore, she regards it as important to understand where redundancy in web content is unacceptable. "If a text-based work is divided into multiple pages, any of which theoretically could be accessed first, you may well have to repeat some information on more than one page, so as not to force users to jump around too much and lose their place. However, if there is too much redundancy, it will frustrate and confuse users" (Gahran, 1998).

2.6.3 Handling of microcontent

All documents need clear headlines and titles to capture the reader's attention, "but for several reasons peculiar to the web this basic editorial element is especially crucial" (Lynch & Horton, 1997). Headings and titles provide the user with information as to where they are on the website, describe the content of the current page and may provide contextual

navigation. Nielsen (1999e) indicates that headlines and other microcontent should be written differently for the web than for other media, as "they are actionable items that serve as user interface elements and should help users navigate". He reasons that headlines are often removed from the context of the full page and used in tables of content and in search results, while page titles are normally the default way to refer to pages in navigation support mechanisms such as bookmark lists, history lists, overview diagrammes, etc. (Nielsen, 1996a).

Web microcontent should therefore be as self-explanatory as possible. "It should provide context, not depend on context" (Gahran, 1998). Other recommendations put forward for the handling of microcontent include:

- Nielsen (1999e) specifies that the writing needs to be very plain and should meet two goals, i.e. to tell users what is at the other end of the link with no guesswork required, and to protect users from following the link when they are not interested in the destination page.

- The main document should have a very distinct title. The sub-documents should then have related titles (US EPA, 1996).

- Neale & McCombe (1997) and Levine (1995) recommend that titles be short, accurate descriptions of content in a page and always include the organisation/site name. They argue that this will provide those who bookmarked a particular page with an accurate description of the page as well as where it came from. For similar reasons it is important to ensure that the first words on documents are relevant to the topic, as many search engines look for and index just these words.

- Lynch & Horton require that titles be optimised for quick scanning. This implies moving information-carrying items toward the beginning of the title and preferably starting with a word that will match the user's need when scanning down a menu or listing of titles. Nielsen (1996a) adds that titles should have enough words to stand on their own and should be meaningful when read in a menu or search listing. On the other hand, overly long titles slow down users – "so as a guideline aim at titles between four and ten words".

- Levine (1995) recommends the use of unique titles for each page, and that the title that appears in the header of the browser window matches the HTML page title.

- Lynch & Horton (1997) consider titles and headers as "editorial landmarks" and the fundamental human interface issue in web pages, as it is the case in print publications. Therefore, they believe that a consistent approach to titles, headlines and subheadings will assist users to navigate a complex set of web pages.

- URLs should contain human-readable directory and file names that reflect the nature of the information contained in the website. Reasons presented for this requirement by Nielsen (1996c) are that users try to decode URLs of pages because of the lack of support for navigation and sense of location in current web browsers. In addition, users sometimes need to type in a URL: "The risk of typos could be minimised by using short names with all lower-case characters and no special characters" (Nielsen, 1996c).

2.6.4 Link text

Links should be properly used in text. Lynch & Horton (1997) recommend never to construct a sentence around a link phrase such as "click here for more information". General guidelines provided by Levine (1995) are to write about the subject as if there were no links in the text. The link anchor should then be placed on the most relevant word in the sentence.

The user should be able to scan the text links and learn something of their destination without much reference to the surrounding text. It is therefore necessary to choose meaningful words for link text. An appropriate length should also be chosen – a single word may be too small a target, while using an entire sentence may be difficult to read. Links should be chosen to support concept and structure. Even if it is not possible to match the text displayed in a link with the title of the destination page, an attempt should be made to choose link text that has a conceptual similarity to the title and headers of the destination document. Furthermore, to provide context for a link, surrounding text should help users to understand what the link does, where the link leads to, and what value they will receive if they select a link.

The US EPA library (1996) recommends that it be indicated when a link to documents on other servers is made: "For example don't say: look in the Public Health Statements database but rather: look in the Public Health Statements database on the website hosted by the Agency for Toxic Substances and Disease Registry (ATSDR)."

2.6.5 Metadata

The guideline document for information published in electronic formats (Australia, DFA, 2000), describes metadata as "information about a document", while Harris (1997) defines metadata as "information about information". Carton (1998:22) states that "our current information glut illustrates that unmediated data is garbage" and that users thus do not need more data, but better data. He argues that it is metadata that will add value to content and will improve content availability. Kelly (1999:76) describes metadata as "the missing architectural component of the web" and states that, although the initial web protocols enabled resources to be located, transported and displayed, HTML only enabled simple document structures to be defined, but failed to provide a means of defining information about the resource. According to Kelly (1999:77), the failure of automated search engines to provide effective results resulted in an initiative to develop a set of attributes for resource discovery. The initiative, getting known as Dublin Core metadata set, identifies 15 core attributes for resources, and has gained international recognition (Kelly, 1999:77).

Internet search engines use metadata to find and classify the content of websites. Furthermore proper information management practice requires that information be organised and categorised for easy finding thereof. Harris (1997) argues that, as the challenges produced by the increasing quantity of information continue, access to high quality meta-information will become increasingly important. It is thus necessary that websites incorporate descriptions of their key information resources and services in the form of metadata records to facilitate resource discovery and consistent access to information (Australia, DFA, 2000). According to the guideline document for information published in electronic formats (Australia, DFA, 2000), the metadata may be contained in the 'head' section of web documents, or can be stored separately in a database or metadata repository, and linked to the documents it describes. The metadata for the specific website should consist of descriptive elements relevant to the specific website, providing information so that users will be able to tell how old a document is and who wrote it.

3. INFORMATION ARCHITECTURE/ORGANISATIONAL STRUCTURE

According to Sullivan (1997) "processes underlying human learning and memory do not allow us to randomly acquire or recall disorganised, haphazard bits of information". Rather, we learn and remember collected pieces of related information and map new information in terms of its relationship to existing knowledge. Sullivan (1997) regards a website thus as a

global information repository that mirrors the way we retrieve, organise and think about information.

3.1 The home page

The home page is the most important page on a website and establishes the site's identity. "It can impress users, generate interest and curiosity or, if poorly designed, cause indifference or even repel users" (Suno, 1996:131). As the home page acts as main point of entry to the complexity of web pages, it represents the user's context. Every time the user returns to the home page he/she gets back to this context. The home page thus sets the expectations or provides a mental model of the subsequent user experience (Neale & McCombe, 1997).

The home page should therefore portray the business of the organisation in a distinctive light and give a clear overview of the content. It should constitute a high-level site map informing users about the full contents of the site and establish the navigation scheme for the rest of the site (IBM, 1997b). The home page should thus identify what information the website contains and who the publisher is, and it should provide essential navigation controls to further information.

According to Lynch & Horton (1997) the home page should not be too long or contain too many links, as it may take too long to download, and the "sheer complexity of longer pages may put users off". Suno (1996:99) requires that category descriptions be general, but specific enough to contain the main objectives satisfying user requirements; the home page can present a general category listing, with sub-pages addressing sub-topics in progressively greater detail. Each major submenu then becomes a mini-home page for that section of the website. Gahran (1998) refers to this as a "concentric" approach.

For very large-scale information spaces, Suno (1996:131) regards immediate access to a search query page as necessary to provide an alternative to browsing. A further important requirement of Lynch & Horton (1997) is to make the presence of new information obvious on the home page.

An important concern for Neale & McCombe (1997) is the use of graphics on the home page. While strong graphics can be effective at getting a user's attention, large graphic menus impose long loading times. Furthermore, long home pages of graphics, animation and text are not only confusing, but also are not visually appealing. According to Lynch &

Horton (1997), the best way to meet the needs of both casual and frequent users is to offer alternate views of the website. According to them, one approach is to develop a visually attractive main home page, but also to offer a text-orientated alternate home page that emphasises rapid access to information via detailed text menus as alternative. Another approach is to use a graphic banner at the top of the page, followed by a set of text-based links.

3.2 Organisational scheme of the website

The main purpose of an organisational framework is to provide the user with a clear, obvious structure when traversing the information space. An obvious framework plays a substantial role in the overall usability, efficiency and usefulness of a website and is an integral part of the web design process.

3.2.1 Site structure

Neale & McCombe (1997) and Lynch & Horton (1997) discuss different ways to structure and organise information on websites. One or a combination of these structures may be applied.

- The simplest way to organise information is where a linear narrative is presented. Information that naturally flows as narrative or time-line, or should be presented in a logical order is ideal for sequential treatment. Neale & McCombe (1997) consider this a good way to present instructional material.

- Lynch & Horton (1997) consider hierarchies as one of the best ways to organise complex bodies of information, as most users are familiar with hierarchical diagrammes and find the metaphor easy to understand. Hierarchies are discussed in more detail in paragraph 3.2.3.

- A third method to organise information, i.e. web structures, poses few restrictions on the pattern of information use. The goal is often to mimic associative thought and free flow of ideas, where users follow their interests in a heuristic pattern unique to each user. This organisational pattern develops in websites with dense links both to other information within the website and information on other websites. It can cause confusion and fuzzy thinking about the interrelationships of the information chunks. According to Lynch & Horton (1997) webs work best for small sites dominated by lists of

links and aimed at educated or experienced users looking for further education or enrichment.

- The grid structure is described only by Lynch & Horton (1997). They argue that grids are a good way to correlate variables, such as a time-line versus historical information in standard categories such as 'events' and 'culture'. Furthermore, they believe that information such as lists of courses and procedural manuals can best be organised as a grid. To be successful, the individual units in a grid must share a uniform structure of topics and subtopics. The topics often have no particular hierarchy of importance. The main rule is to keep it simple and to limit the number of links in any one page (Lynch & Horton, 1997).

Although there is no single way a site should look, work and act, good sites are constructed for immediate utility and understanding by the user: "Format should follow function" (Rettig & LaGuardia, 1999:54).

3.2.2 Chunking of information

According to Lynch & Horton (1997) there are fundamental reasons for subdividing a large body of information. They argue that the limitations of the human brain in holding and remembering information underlie all organisational schemes. Most people can only hold about four to seven discrete chunks of information in short-term memory. They state that the goal of organisational schemes is thus "to keep the number of local variables the user must keep in short-time memory to a minimum" (Lynch & Horton, 1997). They argue further that normal user behaviour is to rarely read long screens of text, as users do not want to scan long blocks of text to find what they need. Lastly, they reason that when a link is followed, the user usually expects to find a specific unit of related information, not "a whole book's worth of information" (Lynch & Horton, 1997).

It is therefore recommended that information be broken down into logical and digestible parts and to organise it into modular units (chunks) of information that all share a consistent organisational scheme. Nielsen (1993:120,121) recommends that information which is important to users and which will enable them to perform most tasks be identified. It will then "be better to design a single screen with this information, relegating less important information to auxiliary screens, than to cram all the information that might possibly be useful into a set of screens" (Nielsen, 1993:120,121).

According to Lynch & Horton (1997), the concept of a chunk of information must be flexible and consistent with common sense, logical organisation and the convenience of the user. The nature of the content should suggest the best way to subdivide and organise the information. Shneiderman (1997), however, warns that information should not be subdivided too much, as it will frustrate the user. The goal should be meaningful structures that guide users to the fragments they want, but excessive fragmentation disrupts those who wish to read or print the full text. According to Lynch & Horton (1997) "one to three printed pages of information will be about right for a chunk of information."

A consistent organisational scheme is important, as a uniform format for organising and presenting information allows users to apply past experience with the site to future interaction, and allows users to predict how an unfamiliar section of the site will be organised. In addition, to reach the goal of a seamless system of pages "you may want to consider bringing important information into your local site and adapt it to the organisational structure and layout scheme rather than using links to send the user away from your site" (Lynch & Horton, 1997).

3.2.3 Internal hierarchies

The concept of hierarchies is familiar to most people. Without consciously knowing it, people absorb information in units that are structured, organised and ordered into sub-components. The human eye first scans at a higher level and then progresses further into detail and related information through the use of hierarchies. Suno (1996:100) therefore argues that hierarchies are a prerequisite to better understanding and quick comprehension in complex, information-intensive projects. Shneiderman (1997) agrees that hierarchical decomposition of information in manageable units is helpful in organising websites.

Neale & McCombe (1997) require that the information structures be confined within the limits of human cognitive capabilities and limitations. Hierarchies must therefore not be too deep, and users must be provided with the information they want in the fewest possible steps and in the shortest time. Deep hierarchies will bury information beneath too many layers of nested menus and force the user to navigate through too many levels to locate real content. Lynch & Horton (1997) argue that important or frequently accessed information positioned deep within the structure only hampers the usability of websites. Suno (1996:101) agrees with this view and points out that direct access to the needed information can contribute towards allowing users to fulfil some specific task. However, he warns that hierarchies should not be too shallow, as this may result in long menu pages

that over time may develop into lists of unrelated information listed in no particular order that could confuse the user.

Normally, complex document structures require deeper menu hierarchies, but users should never be forced into page after page of menus if direct access is possible. The goal is to produce a well-balanced internal hierarchical tree that facilitates quick access to information and helps users understand the organisation of information. In the case of bigger sites, Shneiderman (1997), however, prefers a higher branching factor for index pages, especially if it can save an extra layer: "The extra layers are almost more disorientating than longer index pages". Lynch & Horton (1997) agree with this view and refer to interface studies that have shown that users prefer fewer, denser screens of choices to many layers of simplified menus. According to them text or list-based menu pages can easily carry 12 links without overwhelming the user or forcing them to scroll through long lists. Rosenfeld (1998) refers to usability studies on the design of tables of content conducted by Toub and Farnum that further support this preference. According to him, these studies found that users preferred longer, more information-rich tables of content to ones that had just major categories with scope notes. In other words, they preferred a broader, shallower hierarchy with many options on a single long page.

According to Lynch & Horton (1997), a successful hierarchical scheme is created by ranking the chunks of information in importance, and then organising them by the degree of interrelationship among units. The hierarchy can then be built from the most important or most general concepts down to the most specific or optional topics. The goal is to build a hierarchy of menus and pages that feels natural to the users, does not interfere with their use of the website, or misleads them (Lynch & Horton, 1997).

Nielsen (1996b) considers the concept of a sub-site as a helpful additional structuring mechanism for information spaces that cannot easily be hierarchically structured, or (in the case of hierarchies) to give particular prominence to "a certain level of the hierarchy that is used as the sub-site designator" (Nielsen, 1996b). He defines the sub-site as "a collection of web pages within a larger site that has been given a common style and shared navigation mechanism" (Nielsen, 1996b). According to him, this collection of pages can be a flat space or it can have some internal structure, but there should be a single page that can be designated as the home page of the sub-site. He requires that each of the pages within the sub-site have a link pointing back to the sub-site home page as well as a link to the home page for the entire site. Also, the sub-site should have global navigation options. Nielsen views sub-sites as a way of handling the complexity of large websites: "By giving a

more local structure to a corner of the information space, a sub-site can help users feel welcome in the part of the site that is of most importance to them" (Nielsen, 1996b). In addition, he reasons that as a large site often contains heterogeneous information that cannot all be fitted into a single standard structure, the ability to have sub-sites with somewhat different look and feel can provide an improved user experience.

4. NAVIGATION AND SEARCH

Navigation deals with how easily the site and pages are explored and is concerned with menu design, indexes, tables of content and search functions. Linking and quality thereof are also relevant.

According to Sullivan (1997) information content on a site represents its "base" value and is a primary concern for websites. Anything that makes the information on the site easier to find or renders it more accessible, represents an incremental addition to this base value. Spool (1998) considers the most successful sites as those where the content and navigation are inextricability linked: "You cannot remove content without updating the main navigation pages."

4.1 Site navigation

4.1.1 Ease of navigation

In order to use a site effectively, and in order to get to the important information, it must be navigable and easy to use. Lynch & Horton (1997) state that a site should provide for the needs of all potential users, and should never require users to simply conform to an interface that puts unnecessary obstacles in their way. Simplicity should thus be an important concern. They argue that the more intricate the interface, the more skill and practice are required to use it. If users have to spend time to figure out how to move between pages, a less navigable, less soundly structured site has been created.

Nielsen (1999e) regards the back button as "the lifeline of the web user and the second-most used navigation feature". He recommends not to break or slow down the back button through opening a new browser window, through using an immediate direct (the browser returns to a page that bounces the user forward), or by preventing caching. He also warns against opening new browser windows. According to him designers open new windows on the theory that it keeps users on their sites. However, he regards this strategy as self-

defeating, as it disables the back button, "which is the normal way users return to previous sites". He argues that users often do not notice that a new window has been opened, especially when they are using a small monitor where windows are maximised to fill the screen (Nielsen, 1999e).

Another usability guideline provided by Nielsen (1993:139) concerns the provision of shortcuts. According to him, it should be possible for the experienced user to perform frequently used operations fast by using shortcuts. Users should be allowed to go directly to the desired location in large information spaces, such as a file or menu hierarchy. According to him a hypertext-like approach can be used with links between information elements that are likely to be used together. Alternatively, popular pages may be given easy-to-remember names that have to be typed in by the user (Nielsen, 1993:139).

In order to increase the user's feeling of being in control, Nielsen (1993:138) requires the system to offer the user an easy way out of as many situations as possible. He uses the example of dialogue boxes that could have a cancel button or other escape facility to bring the user back to the previous state. He believes that a basic principle for user interface design should be to acknowledge that users would make errors irrespective of what else is done to improve the interface, and that one should therefore make it as easy as possible to recover from these errors. The various exit and undo mechanisms should be made visible in the interface and should not depend on the user's ability to remember some special code or "obscure combination of keys" (Nielsen, 1993:138).

4.1.2 Selection of links

Levine (1995) states that the presence and placement of links affect the usability of websites. Links provide connection to other content and organisational markers, and are a means to define terms and provide references. According to Suno (1996:89) the main advantage of hypertext linking is that it supports quick traversal across the information structure to related or needed information, as it allows for information to be accessed from multiple locations (or hierarchies) within the architectural framework. He thus requires that web designers provide needed, useful links or functionality without overloading the page with secondary functionality, and avoid a sudden jump to a different location, as it could disorientate the user.

As in the case of information architecture, the links and functionality provided on a website should be determined by the specific users' tasks and the purpose of the website.

Overusing links that are unrelated to the current topic presents unnecessary diversions to the user and leads to useless trips to irrelevant information.

Neale & McCombe (1997) and Nielsen (2000a) discuss two types of navigation. The first, global or structural links, play an important role in user orientation. Nielsen argues: "Pages without structural links become orphans that are not conceptualised" (Nielsen, 2000a). The authors require that users always be able to easily return to the home page and to other major navigation points in the local site. Furthermore, structural links should provide basic navigation and help create the graphic identity that tells users that they are still within the site domain and require that links also be provided to the levels of the hierarchy above the current location. These 'breadcrumb' trails allow users to interpret a page better, as it enables them to see it in context. They also allow users to go directly to a higher level of the site in case the current page is not what they want, or when they arrive at pages through search or other means that bypass the higher-level navigation pages. Furthermore, structural navigation should provide a link to a page that provides an overview of the current sub-site or region and it should allow the user to always get to the search function from any page in case the user is lost in hyperspace (Nielsen, 2000a).

The second type of navigation, contextual navigation, exists of local links to related content. According to Neale & McCombe (1997) it provides the user "a robust way to navigate a single information space that might be a self-contained section within a larger site". Users often land directly on a page, for example using a search engine, and one often cannot predict how knowledgeable the user is of the subject matter. Therefore, links to similar or related pages will be useful to help users to orientate themselves. According to Levine (1995), local links could include links to similar products, related products, different versions of the current product, earlier or later versions of topic background information, author biographies, or a discussion about the current topic.

Lynch & Horton (1997) highlight another important aspect of navigation. They argue that hypertext systems share a common problem that is not relevant in printed media – going back through a series of links that have previously been visited is not the same as paging back through the preceding pages of an ordered sequence of pages. Users therefore need organised interface elements to enable them to follow and understand hypertext links from one page to another. This is particularly true when the designer wants users to be able to follow or recognise an ordered sequence of documents. By augmenting the standard web browser's back and forward buttons with 'next page' and 'previous page' buttons built into the page itself, interface tools are provided for users to navigate through the information in

the sequence the designer intended. In this regard, Levine (1995) recommends describing a destination link in absolute terms, rather than using an implied destination, as it cannot be predicted "whence someone came". According to him 'previous' and 'next' assume that users can predict the structure. As the document structure is foreign to many users, he considers a phrase like "ahead to chapter 5: Qality", better than 'next' (Lynch & Horton, 1997).

If pages are long, with several distinct sections that are not visible from the first screen, a short list or index of the section should be provided. According to Levine (1995) this will serve two purposes: first-time users will get a sense of what to expect, and returning users will be able to more rapidly navigate to the required destination.

According to Nielsen (2000a) user behaviour is characterised by the following:

- Users comment on the content first; if the content is not relevant, they do not care about any other aspect of the design.
- When they arrive on a page, users ignore navigation bars and other global design elements, but instead look at the content area of the page.
- Users often do not understand where they are in a website's information architecture.
- In pursuit of their goal, users often rely on search as their main strategy.
- Users rarely look at logos, mission statements, slogans or any other elements they consider 'fluff'.
- If a page does not appear relevant to the user's current goals, then they will ruthlessly click the back button (Nielsen, 2000a).

In the light of this, Nielsen (1993:120,121) argues that navigation is overdone on many sites. He states that it is a common design pitfall to believe that providing many options and several ways of doing things will satisfy everybody. "Every time you add a feature to a system, there is one more thing for users to learn" (Nielsen, 1993:120,121). Nielsen further argues that this so-called "spoke design" where every page is linked to every other page reduces usability. He adds that sites often have overblown footers that link to too many meta-features. According to him there is no reason to mention all features of the site on all pages; instead, a very small number of highly useful features should be selected. The available space should then be used for useful links to related articles. He further argues that, having a small number of standard links on every page will make it more likely that users will notice those links they need. A link like "how to contact us" can safely be relegated to the home page, which is where users will go when they need it (Nielsen, 1993:120,121).

This does not mean that one should never provide alternative interaction techniques. According to Nielsen (1993:122), alternatives can be used when "users will be able to easily recognise the conditions under which each one is optimal so that they can consistently choose the optimal technique without additional planning: (Nielsen, 1993:122).

However, every web page should contain at least one link. 'Dead-end' pages (pages with no links to any other local page in the site) usually frustrate users, and are often a lost opportunity to bring users into other pages in the site (Lynch & Horton, 1997). As already mentioned, users often follow links directly to sub-section pages buried deep in the hierarchy of websites. They may therefore never see the home page or other introductory information on the site. If the sub-section pages do not contain links back up the hierarchy, to the home page or to local menu pages, the reader is essentially locked out of access to the rest of the website.

4.1.3 Grouping, visibility and labelling of links

Links should be displayed and organised in such a way that it aids navigation.

Only the most useful and interesting links should be placed in the main body of the text. All minor, illustrative, parenthetic or footnote links should be placed at the bottom of documents where they are available, but not distracting. The inclusion of the URL itself could also be considered, so that this information will not be lost if users print out the document or save it to disk.

Murthy (1997) recommends that in cases where a single page contains many links, the links be presented as a list rather than as links embedded in text. In addition, she prefers a one or three-column format to a two-column format when a set of links is presented.

Levine (1995) is of the opinion that where pages are consistently longer than one-and-a-half screens, it may be valuable to place navigation links at the bottom of the page in addition to putting them at the top, to help users navigate without scrolling back to the top of the page.

A link should give users explicit cues to where it will lead, how much information is at the other end of the link and how the linked information relates to the current page. A way to achieve this is to avoid concise menus: "It should be explained what each link contains, so

that users can find the right link the first time" (Serco, 1999a). Users should also be informed in advance when a link may be slow, since this information may affect their decision whether to take the link. Progress indicators should be provided to show the status of lengthy downloads (Serco, 1999a).

Furthermore, issues mentioned in paragraph 2.6.4 (link text) should also be kept in mind with regard to the handling of links.

4.1.4 Additional navigation aids

The provision of a mental model of the information space can contribute to making a site more usable. Several methods can be implemented in this regard, such as spatial overviews, graphical overviews, tables of content, alphabetical or chronological indexes, and searches. Neale & McCombe (1997) refer to the provision of alternate views to the same information space. According to them, this approach will accommodate the range of user behaviour, but they warn that it should be made clear that these alternate views are different representations and that they do not represent the data collectively. In addition, Shneiderman (1997) mentions that services that go beyond traditional media, such as indexes, fast string search, history-keeping, comparison and extraction are also available for website designers.

4.2 User orientation

Lynch & Horton (1997) regard the main interface problem in websites as the "lack of a sense of where you are within the local organisation of information". They argue that this sense of "where you are" in paper documents is a mixture of graphic and editorial cues supplied by the graphic design of the book, the organisation of the text, and the physical sensation of the book as an object. However, electronic documents do not provide the same level of visual cues as paper documents – a web link provides few cues to where it will go, how much information is at the other end of the link, and exactly how the linked information relates to the current page (Lynch & Horton, 1997). They argue therefore that web pages need to give the user explicit cues to the context and organisation of information. Constant visual and functional confirmation of the user's whereabouts and options could be provided via graphic design, navigation buttons or uniformly placed hypertext links. In addition, clear, consistent icons, graphic identity schemes, and graphic or text-based overview and summary screens can give users the confidence that they can find what they are looking for without wasting time (Lynch & Horton, 1997).

As users may access pages directly without coming in through the home page, web pages need to be more independent than pages in a conventional book. Nielsen (1996b) recommends that all pages include a clear indication of what website they belong to. This usually means that the headers and footers of web pages should be more informative and elaborate than printed pages. According to Nielsen (1996b), a recommended standard is to put an official logo at the top of all pages. When clicked on, the logo should take the user to the home page of the site. In addition, individual web pages often need information such as 'copyright', 'author, and 'date' at the bottom, because a single web page may by the only part of the site some users ever see (Nielsen, 1996c).

4.3 Search mechanism

The dilemma with the web is the difficulty of finding what you need among all the available information. Levine (1995) recommends a search for sizeable websites, or even smaller sites with non-obvious structures, since it would improve retrieval and accessibility. According to Suno (1996:92), search engine technology provides the necessary means to find documents based on specific user queries, such as date, keywords, or author. It delivers specific information to the user, instead of the user browsing "coarse-grained hierarchies to locate it" (Suno, 1996:92).

Nielsen (1997c) considers search as the most important user interface element in any large website. He recommends that sites with more than about 200 pages offer a search. He argues that usability studies show that more than half of all users are search-dominant, about a fifth are link-dominant and the rest exhibit mixed behaviour. The search-dominant users will usually go straight for the search button, while the link-dominant users prefer to follow the links around a site: "Even when they want to find specific information, they will initially try to get it by following promising links from the home page. Only when they get lost, they will use the search command" (Nielsen, 1997c). He further argues that mixed-behaviour users switch between searching and browsing, depending on what seems most promising to them at a given time.

According to Suno (1996:92), this type of user behaviour makes it clear that the search mechanism should be additional to the browsing structure: "Relying solely on search could inhibit users from finding information."

4.3.1 Scope of the search mechanism

Two ways of applying the search mechanism are put forward by Nielsen (1997c). Firstly, the total site should be searchable on full-text documents. Nielsen (1997c) requires that this search option should be easily available from every single page on the site. Secondly, scoped searches, i.e. restricted searches on specific parts of the website, can be provided. According to Nielsen (1997c), special areas of the site might be "sufficiently coherent and distinct" from the rest of the site to offer a scoped search. He, however, warns against scoped searches, since users often do not understand the structure of sites. According to him, they may think that they are searching the entire site or a different sub-site than the one they are actually in (Nielsen, 1997c). Levine (1995) recommends that the scope of the collection being searched be explicitly stated on the search page when a scoped search is used. A link should be provided to the page that searches the entire site.

4.3.2 Query formulation, viewing and manipulation of results

Searching can be a complex task, and many users are poor at query formulation. However, Shneiderman (1997) considers the emergence of information visualisation strategies for viewing and manipulating large collections as changing many of the search problems of users. He argues that systems can provide a simple interface where users can type in keywords, whereafter a relevance-ranked list of result items is provided. In addition, advanced modes such as scopes, the use of boolean operators, and parametric searches are available for more sophisticated users. Various authors (Nielsen, 1997c; Pollock & Hockley, 1997; and Gray, 2000) support the need for both simple and advanced search options.

However, Shneiderman (1997) argues that users get frustrated when they do not know what the results mean, or when they cannot control aspects of the search. He argues that many systems provide no indication whether stemming, case matching, stop words or other transformations can be applied, and that "relevance ranking is a mystery to most users". He states that the future of search services on the web may depend on how well user frustration and confusion are reduced, while enabling them to reliably find what they need (Shneiderman, 1997).

Shneiderman (1997) lists the following attributes of a good user interface, stating that these will satisfy first-time, intermittent, as well as frequent users:

- The possibility to search appropriate collections.

- Fields for limiting the source. Structured fields as well as text fields are required.
- Phrases, to allow entry of names or concepts.
- Variants, to allow relaxation of search constraints such as case sensitivity, stemming, partial matches, phonetic variations, abbreviations or synonyms.
- Search actions performed by a button with a consistent label, location, size and colour.
- The functionality to change the parameter of the formulation phase, which immediately produces a new set of results. The search engine should allow the user to revise and edit a complete search, without it being necessary to retype the search each time.
- The functionality to review results. This involves reading explanatory messages, viewing textual lists, manipulating visualisations, controlling the size of the result set, changing of sequencing and clustering (for example alphabetically or chronologically), and choosing how the results are displayed. With regard to the latter, Gray (2000) mentions that the user should be allowed to view results for example in a standard, compact or detailed format, and to select whether he/she wants to see titles only or titles and summaries for each hit.
- Refinement of searches. Gray (2000) refers to the functionality to select a document in the results list that is close to what is required and then doing a search to find documents similar to that document – the search then uses search criteria based on the indexing of that particular document.

According to Shneiderman (1997), such a search framework can make the search process more visible, comprehensible and controllable by users.

In addition, the following principles for search are considered as important:

- Search engines should allow also for natural language searching (Gray, 2000).
- Pollock & Hockley (1997) argue that users are much happier searching for information from hierarchical categories rather than keywords. According to them, their research found that Yahoo was the most popular search engine, largely because it leads users through the process of browsing through categories, rather than requiring them to formulate search keywords. Gray (2000) also supports the inclusion of this facility on websites.
- Pollock & Hockley (1997) indicate that an intelligent search engine should make provision for misspelled names and spell-checking facilities.
- According to Nielsen (1997c), search systems can be made more usable by offering synonym expansion, by "recognising the concept of quality in addition to relevance", and by presenting results relative to the structure of the site. He uses the example of a site with a frequently asked question (FAQ) about a query term. According to him the

FAQ should be listed at the top of the results page even if other pages have higher relevance scores. In addition, he suggests that hits on a series of pages that belong to the same area of the site be collapsed into a single reference to that sub-site (Nielsen, 1997c).

- Search results should be returned to users as quickly as possible. Clear 'in progress' indicators to reassure users that something is happening will help to improve confidence in the effectiveness of search tools (Pollock & Hockley, 1997).
- Kirk (2000) specifies that search engines provide summaries of retrieved documents, distinguish types of information other than by file extension, and not retrieve documents from its own archives when the documents are no longer on the site.

5. DESIGN AND LAYOUT

5.1 Design and layout of the website

This category specifically deals with the 'look and feel' of the site with regard to aesthetic and affective dimensions. It deals with how well the site is designed in terms of graphics, readability and the use of creative elements (Wilkenson et al, 1997). Lynch & Horton (1997) regard visual and functional continuity in the website organisation, graphic design and typography as essential to convince users that the website offers them timely, accurate and useful information: "A careful, systematic approach to page design can simplify navigation, reduce errors, and make it easier for the user to take full advantage of the information and features of the website" (Lynch & Horton, 1997).

5.1.1 General impression

Despite the fact that design is a subjective issue, particular design issues are required of all good websites. Websites must embody aesthetic qualities in terms of colour, design, harmony and appeal. According to Rettig & LaGuardia (1999:54), good websites also display a sense of their medium. They "weave together relevant text, audio, video and images to give users a rich experience".

Smith (1997) requires that visual effects enhance the site and not distract from the content or be a substitute for content. Furthermore, the design should enhance information delivery and be relevant to the content. Lynch & Horton (1997) state that the graphic and editorial style for the website should evolve as a natural consequence of consistent and appropriate handling of content and layout.

Good design should create a usable site. Usability, on the other hand, should not constrain good design: "Functionality and design should blend all together to create a positive user experience" (Story, 1999).

5.1.2 Balance between design elements

According to Lynch & Horton (1997), good graphic design creates visual logic and "an optimal balance between visual sensation and graphic or text information". They reason that pages are often graphically boring without the visual impact of shape, colour, and contrast, and that they therefore will not motivate the user to investigate their contents. However, without the depth and complexity of text, high graphic pages risk disappointing the user by offering a poor balance between visual sensation, text information and interactive hypermedia links (Lynch & Horton, 1997).

Lynch & Horton (1997) further argue that the primary task of graphic design is to create a strong, consistent, visual hierarchy where important elements are emphasised, and where content is organised logically and predictably. Readers see pages first as large masses of shape and colour, with foreground elements contrasted against the background field. Only secondary to this do they begin to pick out specific information, first from graphics and then from text. Thus, they regard the overall graphic balance and organisation of the page as crucial to drawing the user into the content. "Proportion and 'appropriateness' are the keys to successful design decisions" (Lynch & Horton, 1997).

5.1.3 Organisation of information on screens

According to Lynch & Horton (1997), the spatial organisation of graphics and text on a website can provide the user with graphic impact, direct the user's attention, prioritise information, and make the user's interaction with the website more efficient. "We seek clarity and order in information sources, whether they are traditional paper documents or web pages" (Lynch & Horton, 1997).

According to Shneiderman (1997), screen layouts using the "gestalt" rules for human perception can increase the user's understanding of relationships between dialogue elements. According to these rules things will be seen as belonging together when clustered as a group or unit, if they are close together, are enclosed by lines or boxes, move or change together, or look alike with respect to shape, colour, size, or typography.

He recommends that these principles of graphic structure be used to help the user understand the structure of the interface. Preece (1993:71, 72) also recommends techniques such as colour coding, graphic borders around groups of information, highlighting, and the use of reverse video or brightness to achieve this.

In terms of normal user behaviour, users in English read from left to right and from the top to the bottom, and information that is presented 'first' in the usual reading direction normally gets more attention. Users also expect the first item in a page to be more important and are likely to select it. Lynch & Horton (1997) therefore recommend that designers carefully consider the arrangement and sequencing of information on web pages to make provision for this type of user behaviour. In addition, they consider the best measure of the efficiency of page design as the number of options available in the top four inches of the screen, "as it is the only area one can be sure that most users see". They argue that a complex home graphic that takes long to download, does not fit on the average screen, or offers little or no functionality, will repel most users. According to them the most effective page header incorporates a combination of graphics and interactive links, most often in the form of an image map. If correctly applied, it can deliver impact to the page while offering the user links within the top part of the page. They recommend that, even if graphics are not used, the header area should contain a prominent title at or very near the top of the page. To be effective, these title elements must be carefully standardised across all pages (Lynch & Horton, 1997).

To further enable users to know where to find a given piece of information, Lynch & Horton (1997) believe that a consistent format for all the screens should be used. Every web page also needs to carry basic information about the origin and age of the page, but as it often does not deserve the prominence of being placed at the top of the page, Lynch & Horton (1997) recommend that page footers carry this basic information.

In addition, Lynch & Horton (1997) consider it a common mistake in web design to spread the horisontal width of the page graphics beyond the area most viewers can fit on their screens. The layout must ensure that the portion of the page that is visible in the graphic safe area is meaningful.

5.1.4 Page length

Levine (1995) and Nielsen (1996c) refer to usability studies that have shown that few users scroll through web pages to find the information they are looking for. However, in 1997,

Nielsen (1997b) added that more recent studies found that users are now more willing to scroll. He, however, still recommends that scrolling be minimised, especially on navigation pages. Lynch & Horton (1997) state that the main problem caused by scrolling is the disorientating effect it has on users. According to them this loss of local context is particularly troublesome when basic navigation elements disappear off the screen as the user scrolls through long pages.

Lynch and Horton (1997) thus argue for web pages that contain no more than one or two screens worth of information, and which feature local navigation links at both the beginning and end of the page layout. Long web pages require the user to remember too much information that is scrolled off the screen and when the major links are not visible it causes the loss of context. Furthermore, Serco (1999a) warns that designers should also avoid pages that appear complete on a small screen while hiding important buttons or links just off the bottom.

However, Shneiderman (1997) regards long pages as useful for providing information that one does not expect users to read online. If pages present text that users will want to read at length, he regards longer, scrolling pages to be acceptable, as it will allow the user to advance in the text with less loss of mental context than when following a link (Shneiderman, 1997). According to Lynch & Horton (1997) this advantage lasts up to about four screens of text. After that, there is a tendency for users to lose context and to get frustrated with scrolling. They, therefore, recommend as a general rule that the majority of pages be no longer than one-and-a-half screens of text.

Lynch & Horton (1997) describe another situation where long pages are acceptable, i.e. in well-designed modular systems covering particular topics. Longer pages could be updated more quickly without needing to change large sections of information or reformat complex pages. Another advantage is that the URL of each topic page remains the same, regardless of how long the page becomes. "Modular systems are better when you want to give your readers a sense of stability, even when the website expands" (Lynch & Horton, 1997).

One reason why long pages are often preferred is that they are easier for managers to organise and maintain and for users to download or print. According to Lynch & Horton (1997), determining the proper length for a web page requires balancing four factors:

- the relationship between the page and screen size
- the particular content

- whether the user is expected to browse the content or to download the documents for later reading
- the bandwidth available to the target audience.

In general, they recommend shorter web pages for home pages, menu or navigation pages, documents to be browsed and read online and pages with large graphics.

5.1.5 Design for print

The IBM web guidelines (1997b) consider some information appropriate for printing, for example text that users may want to keep as reference material. Very long documents, however, download slowly and present printing problems for the user seeking "just that one fact" (IBM, 1997b), whereas documents in many small parts are tedious to search, print or save. It is therefore recommended in the guidelines that these pages be designed so that they format well in printed as well as on-screen form (IBM, 1997b). A solution offered in the guidelines is to offer two versions: one in which the document is divided into several smaller sections (to facilitate browsing), and a second in which the document is provided as one long document (to facilitate downloading and to provide a means to print multiple pages as a collection). The US EPA library (1996) recommends providing the document in whole as an Acrobat document and in parts as an HTML document, as it will provide a compromise that will meet most needs.

5.1.6 Simplicity of design

For Nielsen (1993:115), one of the established usability principles is simple and natural dialogue. Preece (1993:70) requires an uncluttered screen design that can be achieved by simplifying user interfaces as much as possible. She argues that irrelevant or rarely needed elements should be limited, since any additional feature or item of information on a screen is "one more thing to learn, one more thing to possibly misunderstand, and one more thing to search through when looking for the thing you want, competing with the relevant units of information and diminishing their relative visibility" (Preece, 1993:70). The ideal is to present exactly what the user needs at the time and place where it is needed. Interfaces should match a user's tasks in as natural a way as possible. Mapping between computer concepts and user concepts should become as simple as possible and the user's navigation through the interface minimised (Preece, 1993:70).

5.1.7 Consistency in design

According to the US EPA library (1996) "nothing annoys and distracts readers more that a website that looks like a ransom note. Guide the reader with consistent design and colours." Nielsen (1999e) agrees with this view. According to him consistency is one of the most basic, but also one of the most powerful usability principles. Nielsen (1993:132) reasons that users should not have to wonder whether different words, situations or actions mean the same thing – when they know that the same command or the same action will always have the same effect they will feel more confident using the system (Nielsen, 1993:132). Lynch & Horton (1997) further state that a consistent approach to layout and navigation allows the user to quickly adapt to the design, and to confidently predict the location of information and links across the pages of the website. "Repetition is not boring; it gives the site a consistent graphic identity that reinforces a distinct sense of 'place', and that makes the site more memorable" (Lynch & Horton, 1997).

Lynch & Horton (1997) recommends that a layout grid and style for text and graphics be established from the start. Thereafter the designer should keep with it to acquire consistency and unity across all the pages of the website. According to them many aspects of consistency then become easier to achieve as one is following a user interface standard.

5.1.8 Use of tables

Tables allow for flexibility when it comes to screen layout. Neale & McCombe (1997) reason that tables allow a designer control over the layout of pages and make it possible to define the areas of pages, align and position elements on a web page, create margins, or format text and images. The table box can be hidden or shown. Lynch & Horton (1997) recommend that tables used for page design not have borders, as table borders are "ugly and unnecessary". Even in the context of tabular materials, they believe that it is cleaner to use spacing, alignment and indents to delimit tabular information.

5.1.9 Use of frames

According to Lynch & Horton (1997), frames allow a designer to display multiple HTML documents on a single page. Frame-based pages behave differently than regular pages because they are rather meta-documents that call and display HTML documents.

However, the use of frames may provide difficulties with regard to the effective use of websites. According to Nielsen (1996d) the fundamental design of the web is based on having the page as the unit of information. According to him, frames break the unified model of the web and introduce a new way of looking at pages that has not been well integrated into other aspects of the web; with frames, the user's view of information on the screen is determined by a sequence of navigation actions rather than a single navigation action. Navigation does not work, since the unit of navigation is different from the unit of view. Furthermore, he argues that when users create bookmarks, they may not get the same view back at a later date. Also, URLs stop working, as the addressing information shown at the top of the browser no longer constitutes a complete specification of the information shown in the window. If a user copies the URL in order to include it as a hypertext anchor in one of his/her own pages, that anchor will not lead readers to the desired view, but to the initial state of the frameset. "Given that social filtering is one of the most powerful mechanisms for information discovery on the Internet, it is an utter disaster to disable the URL as an addressing mechanism" (Nielsen, 1996d).

In addition to these fundamental problems, Nielsen (1996d) states that many browsers cannot print framed pages appropriately. With frames, the print command often results in the printing of only one frame. Lastly, search engines have trouble with fames, "since they do not know what composites of frames to include as navigation units in their indexes" (Nielsen, 1996d).

However, frames have certain advantages. The IBM web guidelines (1997b) describe frames as very useful for displaying information that one wants to keep visible at all times, such as navigation elements. According to Lynch & Horton (1997), sites suited for frames are those whose content is expected to change frequently. They reason that, because a frame-based site can be designed to have one file for navigation, only one file will have to be modified when pages are added or removed. Frames can also add a certain functional coherence to a targeted area of the site and provide additional interactivity to the page – it allows the designer to put a page up on the user's screen and change its content without actually rewriting the entire screen (Lynch & Horton (1997).

Should frames be used, Nielsen (1996d) considers the main issue to be ensuring that URLs keep working. Therefore, all hypertext links must have a TARGET="_top" attribute in their anchor tag, except when frames are used as shortcuts for scrolling within a single page.

5.2 Text readability and visibility

Sullivan (1997) argues that users will find a site more inviting and readable if it is "easy on the eyes". Conversely, pages that visually over-stimulate a user are difficult to read and likely to result in eyestrain and fatigue. "A reader-friendly web page is one that designs for readability first, uses colour sparingly and appropriately, and avoids visually taxing, chaotic, competing presentations" (Sullivan, 1997).

5.2.1 Choice of fonts and case

Text of web pages should be designed in such a manner that it contributes to the readability and legibility of pages.

According to Nielsen (1996a) a common mistake in text design is the use of large or small font sizes as the body text of a page. He considers it acceptable to make a small percentage of the text on a given page large or small. However, he does not recommended changing the font size of all the text on a page, since it should be assumed that the user has set the default font size in his/her browser to the size that is most comfortable for that user on his/her screen. In addition, Lynch & Horton (1997) state that the amount of typefaces should be minimised. When too many typefaces are used, it destroys the "homogeneous, even 'type colour' that characterises good typesetting" (Lynch & Horton, 1997).

Preece (1993:70) argues that conventional upper and lower case text can be read about 13 per cent more quickly than text that is all upper case. Lynch & Horton (1997) recommend that all-uppercase headlines be avoided. They reason that the latter is difficult to read, because words formed with capital letters are "monotonous rectangles that offer few distinctive shapes to catch the user's eye" (Lynch & Horton, 1997). They recommend the use of down style for headlines and subheadings, with only the first word and proper nouns capitalised. Preece (1993:70) considers upper case characters more effective for items that need to attract attention.

Neale & McCombe (1997) state that fonts, size and style should always be consistent throughout the site to convey the most meaning to the user. It should only be changed to make a point to the user (for example headings). The same font, size and style should be used for similar aspects on the website, for example, a font that is used in one place in the document to differentiate a heading from the text, should not be used in the body text at

another point. According to Murthy (1997), inconsistent use of fonts leads to a cluttered look and to confusion about the inherent structure and organisation of the document.

5.2.2 Alignment and spacing

Left-aligned text is recommended, as text that is not left aligned reduces reading speed. Should it be necessary to make use of another option, Preece's (1993:70) warning that right-aligned text is more difficult to read where words have variable spacing than evenly spaced text with a ragged right margin, should be kept in mind.

According to Preece (1993:70) optimal spacing between lines is equal to or slightly greater than the height of the characters themselves. Murthy (1997) recommends line spacing for text to be 1 to 1,5 times the font size.

5.2.3 Length of text lines

According to Lynch & Horton (1997) text on a computer screen is often difficult to read because the layout of web pages violates a basic rule in typography, namely that the lines of the text on most web pages are too long to be easily read. They recommend that dense passages of text be kept no wider than the users' comfortable eye span.

5.2.4 Application of emphasis

Emphasising important elements can be achieved by highlighting objects by means of large fonts, colour highlights, surrounding boxes or by making them larger (Preece, 1993:70). Preece also mentions reverse video, underlining and making information bolder and brighter.

Nielsen (1999d) considers making everything too prominent as one of the most common mistakes on the web. Murthy (1997) agrees with this view and argues that excessive use of emphasis can cause documents to look cluttered. She recommends re-organising the material first when there is really a need for emphasis. Nielsen (1999d) provides the following guidelines for prioritisation:

- Editorially select the most important stories or items and give them bigger headings or more prominent placement.
- Place links to the areas on the web page that attract most users.
- Highlight the most popular item in a list that is sorted by another criterion.

- Mark new items with a new "glyph" in slowly changing pages.
- Feature content that is deep within the site at higher levels to make the users understand what is new or "hot".

5.2.5 Use of colour

Sullivan (1997) argues that informed colour use could help to make a page more readable, but that colour is best used as a secondary means of highlighting and emphasis. According to him, the colour equation exists of two concepts, namely colour perception and "dither-drivel".

Colour perception consists of:

- The RGB (red/green/blue) method for specifying colour.
- Hue (what colour is present, for example warm and cool colours). Using warm colours in or as a background results in competition for the foreground of the user's visual attention.
- Saturation (how much colour is present). Computers make it easy to create over-saturated colours, but heavily over-saturated "psychedelic" hues result in a visually distracting, fatiguing presentation.
- Value or luminance (how bright the colour is). Luminance affects readability primarily through perceived size and contrast. Thus, a large difference in luminance between foreground and background is a key element in creating an easily readable page.

According to Sullivan (1997) the second aspect, "dither-drivel" concerns colour rendering, which is fairly unpredictable across various graphical web clients. To minimise this client-side unpredictability, he recommends making colours "dither-proof". According to him only 216 colours are considered "dither-proof" or "clean" in most browsers, without at least potentially being subjected to additive colour tricks that may negatively affect readability (Sullivan, 1997).

The following guidelines for the effective use of colour are put forward:

- For graphics that are designed to represent the real world, it is preferable to use colours that represent the everyday counterpart; for schematic representation, it is preferable to conform to existing conventions (red for danger, etc.); for more abstract representations (text or flowcharts) colour could be used more as a form of redundant coding, i.e. an additional to the other types (Preece, 1993:70).

- Colour can be effective to divide a display into separate areas, "for search and detection tasks and for enhancing the legibility of a colour symbol against its background types" (Preece, 1993:70).

- According to Nielsen (1999:119), colour should be used conservatively, as too many colours clutter up the screen, increasing search times. He recommends limiting the design to a small number of consistently applied colours – no more than five to seven different colours – since it is difficult to remember and distinguish larger numbers.

- Colour should be applied consistently. Neale & McCombe (1997) recommend that a colour palette be chosen for the site based on the overall look and feel. The colours in the palette should work well together and should be suitable to be used in a variety of combinations.

- Standard Internet convention is that links to pages that have not been visited by the user are blue and links to previously visited pages are purple or red. Nielsen (1996c) warns not to "mess with these colours", since the user's understanding of what links have been followed is one of the few navigational aids that is standard in most web browsers.

- According to Sullivan (1997), many users do not have the latest true-colour technology: "colour is wasted on about 10% of the total readership" (Sullivan, 1997). He argues that some readers view a site with minimal or monochrome video, while others use browsers with limited colour support and others are physically incapable of seeing certain colours. According to Sullivan (1997), designing a readable web page implies therefore designing for monochrome first, and then adding colour support. Nielsen (1993:119) recommends that any colour coding of information be supplemented by redundant cues that make it possible to interpret the screens without being able to differentiate between the colours. Sullivan (1997) considers it important to rely primarily on structural mark-up tags rather than colour to visually organise a page's contents.

Focusing on readability does not mean abandoning aesthetics. Careful use of a few well-balanced, well-contrasting colours, correctly applied, can be a very effective way to help organise a page visually. Sullivan (1997), however, states: "A reader-friendly approach to web design respects the diversity among web client programs and recognises the difference between visual enhancement and visual assault" (Sullivan, 1997).

5.2.6 Backgrounds

Backgrounds and textures should enhance the visibility of text. Lynch & Horton (1997) argue that website designers with limited background of design should avoid the use of backgrounds. If used, it should be with great care.

The US EPA library (1996) recommends that backgrounds with busy or dark patterns be avoided, as these make text hard to read. As some browsers do not display backgrounds well or not at all, critical information should not be put exclusively in a background.

When choosing colours or backgrounds, an attempt should be made to have high contrast. According to Neale & McCombe (1997) black text on a white background provides high contrast, but could sometimes be too harsh. A light background that facilitates high contrast is more comfortable for reading. Lynch & Horton (1997) and Nielsen (1993:119) consider light greys or muted pastel shades of colours typically found in nature as the best choices for background or minor elements to avoid interfering with text. Bright and highly saturated colours should be avoided except in regions of maximum emphasis, and even there it should be used cautiously. According to Levine (1995) the lowest resolution should be used for background colours. Graphics can be used as elements that are tiled or repeated on a background. If these are used, it must be ensured that they are muted. If a graphic is used and not intended to tile across the screen, it should be made large.

5.3 Graphics, images and animation

The use of graphics, images, animation and sound must be relevant, professional and used with discretion.

5.3.1 Graphics

Despite Spoole's (1998) usability findings that there is no evidence that graphic design is related to the success of finding information on websites, the US EPA library (1996), Neale & McCombe (1997) and Lynch & Horton (1997) believe that images can add a lot to the visual appeal and information content of a page. Well-used graphics can enhance clarity of presentation and make it more understandable for a user. It can also add information and make a page more interesting. However, they warn that images that are used poorly can confuse the audience and can distract from the message. It is therefore important to use

graphical images relevant to the information content of the page and provide images that help explain or demonstrate the subject.

Since multimedia has a bandwidth implication (especially for users with modems), it should be used sparingly and judiciously. Care should be taken with the size, quantity and content of graphics. Large graphics or many small graphics on one page slow down page downloads. Levine (1995) recommends keeping the total size of all images used on a page to less than 30KB, while the US EPA library (1996) recommends keeping it under 40KB per page. Should large graphics be included, they recommend to link to it from a thumbnail (smaller version of the same graphic), and to add a warning to users that they will be entering a high-bandwidth area. This allows users to decide if they want to take the time to retrieve the file. Lynch & Horton (1997) also recommend that users be provided with the tools to control their experience once they are in the area.

According to Nielsen (1994b) thumbnails should not be indiscriminately used. It should communicate some information to the user and give a clear and uncluttered appearance. If it is impossible to represent an image clearly with a thumbnail, it will be better to use a textual description.

5.3.2 Graphical bullets

Icons are small graphic images that are commonly used to represent different aspects of a user interface metaphor (Levine, 1995). Levine (1995) and the US EPA library (1996) believe that the advantage of icons compared with command names is that in many cases they are easier to learn and remember. Used with care, colour-orientated arrows, buttons or pointers can reinforce page layout and cohesiveness, clarify page content or inform. However, poorly employed, for example when they are used as decorations or when they appear to have a function they don't actually have, they can make a page layout look haphazard and unprofessional and mislead users (Levine, 1995; US EPA, 1996).

Levine (1995) recommends the use of graphical bullets to highlight items in a list, to point out special status, to categorise list items, allowing the user to sort them more easily, or to reinforce the thematic content of a page.

Preece (1993:70) regards it important to take the following into account when using icons:

- The context in which the icon is used. The context influences the comprehensibility of the icons.

- The task domain for which they are used.
- The graphic form that is used to depict the object.
- The nature of the underlying object being represented
- The extent to which one icon can be discriminated from other displayed icons.

5.3.3 Consistency

According to Neale & McCombe (1997), a well-designed site will present graphics consistently. This means that a style of graphic should be adopted for a site and used throughout.

5.3.4 Image maps

Sullivan (1997) is of the opinion that a "gratuitous image map" should be avoided in web authoring: "It's a rare image map that's worth the screen space it uses. Image maps that exist primarily to impress aren't really impressive" (Sullivan, 1997).

Levine (1995) supports this view and states that image maps "present rather poor user interface". According to him, there is no clear indication of where a user can click, and having clicked, no feedback to indicate that it has been recognised by the browser. "The only sure cure with current browsers is not to use image maps!" (Levine, 1995).

Nielsen (1997a), however, states that image maps have caused few problems in more recent usability studies. He presents the following reasons for this:

- Users got used to "clicking on pictures that look different from standard GUI widgets".
- Designers are better at visualising "clickability".
- It is rare for pages to consist of one huge image map – instead buttons and clickable areas are more clearly delineated through the combination of multiple graphics.
- Client-side image maps allow some amount of 'feedback' as the user moves the mouse pointer over the image.

Image maps can thus provide a valuable means to navigate a site. When used, Nielsen (1997a) recommends clearly delineating the clickable regions, and if possible making the clickable regions look like "buttons". If there is any ambiguity about where to click on an image map, or what the destination of the links will be, the actions required and the effects of following the link to the user should be described. Lastly, he recommends providing alternate links elsewhere on the page for image map destinations.

5.3.5 Animation

Sullivan (1997) argues that the human eye is basically "hard-wired" to respond to different signals in different areas of its visual field. "Because of the basic distribution of different kinds of visual receptors inside our eyes, there is simply no way to juxtapose text and animation without having them compete with each other visually" (Sullivan, 1997).

According to Levine (1995), people notice change or motion more readily than colour or size, while blinking text will draw a user's eye away from text or image content. He thus regards pages with a lot of motion as difficult to read. In this context, he refers to animation as motion such as scrolling or blinking text, animated gifs, and server-push animations. He also regards apparent motion (such as "moiré-pattern or undulating backgrounds", and competing visual presentation) as taxing on users.

Animation should therefore be used sparingly. Nielsen (1996c) warns never to include page elements that move incessantly. Levine (1995) states that it could possibly be used with the specific goal of distracting the user or to highlighting a single element in a layout at the expense of all others. Murthy (1997) states that animation consumes resources and is distracting, and must therefore be used only when there is a particular need therefore.

5.3.6 Text-only versions

Shneiderman (1997) argues that providing text-only versions for users with small displays and low-bandwidth access are likely to be strongly recommended for many years to come. He believes that users with low-cost devices, users in developing countries with no telecommunication infrastructure, users wanting low-bandwidth wireless access, users with small personal display devices, and users with handicaps constitute a large proportion of potential users.

5.4 Interaction (forms)

Interactivity allows the user to exchange information with a service. "Interactivity is where the real value to the user is made clear: without conviviality or friendliness, nothing is really usable" (Gurn, 1995).

A good way to solicit feedback is to provide a user response form accessible from any page in the site (IBM, 1997b). The IBM web guidelines state that feedback means being prepared to respond to the user's inquiries and comments. Well-designed websites should therefore always provide direct links to the site's editor or the webmaster responsible for running the site. "Planning for this kind of on-going relationship with the users of the site is vital to the long-term success of the enterprise" (IBM, 1997b).

Nielsen (1994b) recommends that forms have as much information as possible filled in for the user. Murthy (1997) recommends that command buttons be visible where the user is likely to need them. They should not be placed too close to each other, or be too small, as they could then be difficult to access. Furthermore, after users have entered data in the form, they should be able to make changes to the information before submitting it. If data is to be entered in fields, the field labels should make it clear what data items must be entered into the field. If possible, data entry fields should contain meaningful defaults (Murthy, 1997).

6. PURPOSE AND AUDIENCE

Various authors, such as Patterson (1997), Smith (1997), Shneiderman (1997), Nielsen (1993:74) and Rettig & La Guardia (1999), agree that websites should be designed with the intended users of the site in mind. Individual user characteristics and variability in tasks are the two factors with the largest impact on usability. Nielsen (1993:73) identifies the concept of 'user' to include everybody whose work is affected by the product in some way, including the users of the system's end product or output.

By knowing the user, it is possible to anticipate their learning difficulties to some extent and to set appropriate limits for the complexity of the interface. Issues that will influence design are for example the users' age group and or educational background, specific knowledge of certain topics/disciplines, work experience, educational level, previous computer experience, work environment and social context. According to Nielsen (1993:74) it is also necessary to know the class of people who will be using the systems. The product could be used in a specific department of a company, or could be aimed toward the entire population or a very large subset.

To design a website for its audience the treatment of information should be appropriate in depth and tone for that audience. This has implications for depth of content, design, complexity/simplicity of the site, reading level, and language and writing style. For example,

scholarly prose will generally be directed to an academic audience, while jargon-free, easy-to-read prose will be used for a more general audience; pages created with an academic audience in mind will generally include a reference list or bibliography to support arguments presented on the site.

Shneiderman (1997) regards as even more important the distinction between first-time, intermittent and frequent users of a website. He believes that first-time users need an overview to understand the range of services and to know what is not available, plus buttons to select actions. Furthermore, intermittent users need an orderly structure, familiar landmarks, reversibility and safety during exploration, while frequent users demand shortcuts or macros to "speed up repeated tasks, compact in-depth information and extensive services to satisfy their varied needs" (Shneiderman, 1997).

According to Shneiderman (1997) identifying users' tasks also guides designers in shaping a website. Tasks can range from simple fact-finding to unstructured open-ended browsing of databases and exploration of the availability of information on a topic. He regards it as an equal challenge to support users seeking specific facts and to help users with poorly formed information needs or who are just browsing.

Nielsen (1993:75) argues that the user's overall goals should be studied, as well as how they approach tasks, what their information needs are, and how they deal with exceptional circumstances or emergencies. Furthermore, the user's model of the task should also be identified, since it can be used as a source for metaphors for the user interface. He advises identifying and observing particularly effective users and user strategies as hints of what a system could support. According to Nielsen (1993:77), one should also analise the underlying functional reason for the task: "What is it that really needs to be done, and what are merely 'surface' procedures that can, and perhaps should, be changed" (Nielsen, 1993:77).

7. CONSOLIDATED LIST OF EVALUATION GUIDELINES AND PRINCIPLES

7.1 Introduction

The previous paragraphs presented a discussion of criteria, guidelines and principles selected for the evaluation of the *SA Government Online* website. After selection, these criteria were synthesised and consolidated in five main groups and 17 sub-categories to yield a standard criteria list against which all websites may be measured. The following

paragraph provides the consolidated list of criteria and more detailed indicators for each. The indicators are formulated in the form of questions against which a website may be measured.

The criteria list and indicators are derived from a wide variety of sources, namely Alexander & Tate, 1997; Alschuler, 1998; Australia, DFA, 2000; Beck, 1997; Bevan, 1995; 1998; 2000; Blount, n.d.; Brandt, 1996; Brooks, 1998; Carton, 1998; Caywood, 1999; Ciolek, 1996; Clausen, 1999; Clyde, 1996; Descy, 1999; Fleming, 1998; Gahran, 1998; Grassian, 1998; Gray, 2000; Gurn, 1995; Harris, 1997; IBM, 1997a; 1997b; Kelly, 1997; Kopak & Cherry, 1998; Lederer, 1999; Levine, 1995; Lynch & Horton, 1997; Morkes & Nielsen, 1997; Murthy, 1997; Neale & McCombe, 1997; Nielsen, 1993; 1996a; 1996b; 1996c; 1996d; 1997a; 1997b; 1997c; 1998c; 1999b; 1999d; 1999e; 2000a; 2000b; Norem, 1998; Patterson, 1997; Patterson, Wendt & Schroeder, 1997; Piontek & Garlock, 1995; Pollock & Hockley, 1997; Preece, 1993; Rettig, 1996; Rettig & LaGuardia, 1999; Richmond, 1997; Rosenfeld, 1998; 1999; Schrock, 1998; Serco, 1999a; 1999b; Shneiderman, 1997; Skov, 1998; Smith, 1997; SOSIG website, n.d.; Spool, J. 1998; Story, 1999; Sullivan, 1997; Suno, 1996; Tillman, 2000; US EPA Region 2 Library, 1996; Welinske, 1998; Wilkenson et al, 1997.

7.2 Content and scope criteria

7.2.1 Orientation to the website

Is an overview of the website provided?

- Is there a statement on the purpose, scope, and target group of the website?
- Are the services and information provided on the website clearly described?
- Are there descriptions of specific sections of the website?

Are copyright and disclaimer statements provided?

- Where relevant, is a copyright statement provided?
- Where relevant, is a disclaimer statement provided?

7.2.2 Authority of the website

Is official sponsorship indicated clearly?

- Is the website officially sponsored or supported by a reputable group, organisation, institution, corporation or government body?

- Is this body recognised as an authority or expert in the field?
- Is background information on this body provided?
- Is it clear on all pages of the website that it belongs to the official website (for example name of organisation on all pages; headers, footers, or a watermark that show the pages are part of the website; a link to a page where such information is listed)?
- If the website includes neither a signature nor indicates a sponsor, is there any other way to determine its origin?
- Can the identity of the server where documents reside be verified?
- Does the URL support the claim of authorship? (Can one easily tell from the domain name where pages originate?)
- Is the URL stable or is the user being redirected to a new URL?
- Is the URL available on documents and pages?

Is authorship indicated clearly?

- Are authors of documents indicated clearly where applicable (either individual or organisational)?
- Is background information for authors provided (full names; contact information, for example address, telephone number, e-mail address; biographical information, for example titles, position, institutional affiliation, educational and occupational background, experience, qualifications)?
- Are authors reputable? In the case of organisational authorship, is it from a known and respected organisation, i.e. corporate, governmental or non-profit? Is the author or source of information knowledgeable and reliable?

Is the information on the website well researched?

- Are bibliographies/references/lists of sources provided where applicable?
- Where applicable, are links provided to documents referred to?

Is the information on the website reliable?

- Is the information reliable and error-free? Are facts accurate?
- Is the information likely, possible or probable?
- Is conflict of interest avoided?

7.2.3 Comprehensiveness/information coverage/scope

Are breadth, depth and amount of information provided adequate?

- Is the breadth of information adequate? (Does the website cover all aspects of the subject/topics/categories of information adequately, or are important information categories omitted? Does the site include all topics or is the site focused on a too narrow area?)
- Is the depth of information adequate? (Is the level of detail provided about each subject/topic/category of information adequate, or is some of the information incomplete?)
- Does the website include only necessary and useful information (or is there superfluous information)?
- Is the site inward as well as outward focused, i.e. does it provide content as well as links to external sites?
- Is a similar extent of breadth and depth of information covered for all the main sections?
- Is overlapping of content coverage avoided? (Is some information repeated in a superfluous way?)
- Are full-text documents provided (as opposed to just titles/bibliographic details)?

Is the selection of links to external sites comprehensive and appropriate?

- Does the website contain content-critical off-site links?
- Are links to external sites adequate and comprehensive, i.e. in the website's capacity as portal/gateway to government information on the Internet, as well as for links to other relevant sites?
- Are links appropriate and acceptable? (Is the subject matter of linked sites appropriate? Are the types of sites acceptable (for example academic, government, commercial, trade/industry, non-profit, private sources, sites maintained by individual enthusiasts, sites that contain advertising)?

Is the information on the site unique?

- Does the website contain primary information?
- What does the site offer that is not found elsewhere? (What advantage does the site have? What is the overall value of the content?)
- Is the content of the website available in another format? If so, does it have all the features of the original? Has any value been added (for example, have extra features been added; does it complement the other resource, for example by providing updates to a printed source)?

7.2.4 Currency and timeliness

Is the website frequently updated and maintained?

- Is the website improved and enlarged appropriately?
- Is the website updated frequently?
- Is the information on the website current and up to date?
- Is the material included in each update current, or do the updates include old information? (Updating of pages may not reflect the currency of the information)
- Is time-sensitive information available in near real-time (for example information such as timetables, schedules and announcements)?
- Is old information or dates for information known to change rapidly avoided?
- Is the presence of new information obvious to the user?

Is there a clear indication of currency?

- Is there an indication of when the website and pages were last updated?
- Is there a clear statement about update frequency for the website?
- Is there an indication of when web pages and documents were created/published?
- Is it indicated when documents were last revised and are version numbers for documents displayed (when applicable)?
- Do the stated dates correspond to the information in the documents?

Is static information contained on the website durable in nature?

- Where static information is contained on the website, is it durable in nature, and is it of lasting use to the audience?
- Is older information still valid, or is outdated information found (information with a limited period of use)?
- Has link-rot set in? Are dead links avoided? Is the website free of links to sites that have moved?

7.2.5 Objectivity and fairness

Is the information provided on the website unbiased and presented in a balanced way?

- Is the website free of political, ideological or other biases?
- Is the website free of advertising?

- Is the text written objectively?
- Are opponents' ideas presented in an accurate manner, or is there a one-sided view that does not acknowledge opposing views or does not respond to them?
- Is only factual information provided, or does the author attempt to sway the user's opinion?
- Is contradictory information avoided?
- Is the site fee of vague or sweeping statements or generalisations?
- Is there a calm and reasoned tone, arguing or presenting information thoughtfully and without attempting to get emotions worked up and inflame feelings?
- Is exaggeration or subjective claims avoided?

7.2.6 Writing and editorial style

Does the website follow basic rules of literary composition?

- Are basic grammar and spelling rules followed, and is the website free of grammatical, spelling and other typographical errors?
- Are there digestible and navigable sections of content (for example shorter sentences and paragraphs)?
- Is the content written in a clear and consistent language style?
- Is a positive and professional tone used? Does it avoid jargon, humour, condescension, and chit-chat?
- Is terminology familiar to the user? Do words as well as non-verbal elements such as icons have standard meanings?

Is the writing style concise?

- Are documents that are intended to be read online concise and structured for fast scanning (for example bulleted lists, highlighted keywords, meaningful headings and short sections of text)?
- Does the write-up start with an overview and then present more detailed information?
- Are main points presented prominently? Are important facts presented near the top of the first paragraph?
- Are menus concise – or perhaps too concise?
- Is writing of the main content as well as microcontent 'tight'? (With about half the number of words that would be used for conventional text? Are short words used? Are sentences short?)
- Is the writing style of longer documents suited for printing?

Is handling of microcontent (headings, page titles, URLs) acceptable?

- Are headings self-explanatory and provide context?
- Are headings simple and plain?
- Are headings clearly phrased, descriptive and meaningful? Do they give a clear indication of what is on the other end of the link when used in tables of content, the home page or category pages?
- If headings cannot be completely descriptive, are there coherent and concise descriptions that follow?
- Does information provided through links match the headings and descriptions?
- Is there a logical hierarchy of headings?
- Are pages clearly and logically titled? (Are there enough words to stand on its own but meaningful when read in a menu and not too long? Are information-carrying terms at beginning of titles and starting with words matching the users' needs? Do they form a concise, plainly worded reminder of the page contents?)
- Do different pages have different titles?
- Do titles incorporate the name of the company, organisation or website?
- Is there a consistent approach to titles, headings and subheadings?
- Are URLs meaningful? (Do they contain human-readable directory and file names that reflect the nature of the information space? Are they simple? Are short names with all lower-case characters and without special characters used?)
- Does metadata add value to the information content and assist users to find the website?

Are links properly used within text?

- Is text such as 'click here' avoided?
- Are only the most salient and interesting links in the body of the text?
- Does the wording of links embedded in text help to scan the contents of pages and give prominence to links to key pages?
- Is link text similar to the text of the destination document?

7.2.7 Inclusion of metadata

- Is metadata provided to describe important resources available on the website?

7.3 Information architecture/organisational structure

7.3.1 The home page

Is the home page a well-organised conceptual space leading to information on the website and to other government information on the Internet?

- Does the home page give a clear overview of the content of the website?
- Does the home page provide a strong sense of structure and is this structure communicated explicitly to the user, i.e. can users tell from the home page how the site is organised and what options are available?
- In large, complex sites, does the home page offer a general category listing, linking to a number of sub-menu pages?
- If a 'site cover' is included, does it fit the purpose of the site?
- Is the presence of new information indicated clearly?

7.3.2 Organisational scheme of the website

Is there a logical site structure?

- Is the information on the website arranged logically?
- Is there a consistent pattern of modular units, grouping and arranging of information?

Is the information broken down into logical and digestible parts?

- Is the material organised in meaningful sections and sub-sections?
- Does the site consist of small chunks of related information that can be scanned and located quickly, i.e. are there coherent, tight groups of relevant pages? (In contrast to long, structurally complex pages or long undifferentiated units of information)
- Is excessive fragmentation avoided? (Are documents broken up too much? Is information placed on separate pages that should rather be placed in separate sections of the same page? Is the information too subdivided, so that context gets lost? Are key concepts spanning across multiple web pages?)
- Are the 'chunks' of information ranked in importance and organised by the degree of interrelationship among units?

Is there a logical internal hierarchy?

- Is there a well-balanced hierarchical tree that facilitates quick access to information and helps users understand how the information is organised?

- Is there a hierarchy from the most important or most general concepts, down to more specific or optional topics, i.e. moving from the general overview of the site (home page) down through sub-menus and content pages that become increasingly more specific and addressing sub-topics in progressively greater detail?
- Is the topic narrowing achieved via conventions such as menus that follow the organisational scheme?
- Is information provided to the user in the fewest possible steps and in the shortest time? (Are too many layers presented, making the link hierarchy too deep? Do the links take users directly to information or do they have to go through a series of mouse clicks to get the information they want?)
- Is the hierarchy too shallow?
- Are hidden layers that are difficult to discover minimised?

7.4 Navigation and search

7.4.1 Site navigation

Is it easy to navigate and browse the site?

- Are minimal user skills required to navigate and browse the website?
- Is it easy to move from section to section, page to page, item to item, without getting lost or confused?
- Do pages provide easy access to related pages?
- Is the practice to break the back option avoided (for example by design options such as opening a new browser window, using an immediate direct or by lack of caching)?
- Is the opening of new browser windows avoided?
- Are shortcut links possible for frequent users?
- Is it easy to switch back and forth from searching to browsing?
- Does the site offer the user an easy way out in as many situations as possible? (Do dialogue boxes have a cancel button or another escape facility to bring the user back to the previous state? Can users back out of the site, or do they get stuck looping between pages?)

Are links relevant and appropriate?

- Are links relevant to the subject/purpose of the website?
- Are local links made to related content, i.e. are links provided between elements that are likely to be used together?

- Are links provided to documents mentioned within the site?
- Do pages contain a list of the local contents?
- Can users easily return to the home page and to other main navigation points in the local site? (Does every page include a link to the home page? Are there links to levels of the hierarchy above the current location/back up in the hierarchy?)
- Does the website make use of links to enable users to navigate information on the site in sequence (for example 'next page' and 'previous page' type of links)?
- Are links provided to assist navigation in long documents (for example 'return to top')?
- Is overdone navigation avoided? (Are there too many – perhaps superfluous – links? Is each page linked to every other page? Are there links to too many meta-features? Does the site hide the important structural information among irrelevant information, for example links to all possible other options? Are too many links used in documents, destroying the homogeneous character of documents?)
- Is the practice to provide too few links, thus making it hard for users to predict what they will find, avoided (especially in large websites)?
- Are navigation icons always available? (Are there pages where there are no hyperlinks to anywhere else? Are there any dead-end pages with no links to any other local page in the site? Are there very long pages with no links?)

Are links logically grouped, visible and well labelled?

- Do links have an obvious ordering scheme?
- Is the website free of too many embedded links?
- If the breadth of a site is larger than the depth, are the links listed as opposed to being embedded?
- Are important navigation options displayed at the top part of the page?
- Are pages that appear complete on a small screen while important buttons or links are hidden just off the bottom avoided?
- Do navigation or menu pages that require the user to scroll, feature local links at both the beginning and end of the page layout?
- Is there a distinction between on-site and off-site links (Is it obvious when one moves to a new site, or does an outside link appear internal)?
- Are links ambiguous, i.e. is it obvious where links go?
- Is a distinction made between a contents list for a page, links to other pages and links to other sites?
- If a document/category/page consists of a collection of links is there substantial annotation or value-added information?

- Are links clearly labelled/annotated? If so, are the annotations of sufficient quality? (Do links give users explicit cues to the context and organisation of information – where a link leads to, how much information is at the other end of the link, how the link relates to the current page? Are users informed about the type and size of files they are linking to, for example a large document or image; graphics/sound/videos? Are users informed when they are about to link off the site?)
- Do essential instructions appear before links requiring user interaction?

Are links consistently applied?

- Are links consistently used throughout the website?
- Are basic links present on every page of the site?
- Is there a consistent approach to navigation? Are navigation aids consistently applied across every page in the site? Is there a consistent approach to navigation links to the home page or related pages?

Are additional navigational aids provided?

- Do larger sites have well-designed site maps and/or indexes?
- Are indexes/tables of content provided to navigate within long documents?
- Are there additional organisation/navigation methods (for example by organisation according to subject, chronology, graphical organisers, concept maps, graphs, etc.?)

7.4.2 User orientation

Can the user easily orientate himself within the website?

- Can every page on the website stand on its own? Can any page be the first page for users reaching the site from search engines?
- Do all pages include a clear indication of what website they belong to? Are there links to information providing an overview of the current sub-site or region? Is the URL provided on major pages?)
- Does the website offer constant visual and functional confirmation of the user's whereabouts and options, i.e. does the site provide a sense of where users are within the local organisation of information, and is it clear to users where they are and where they can go (for example via graphic design, clear consistent icons, navigation bullets or uniformly-placed hypertext links, graphic identity schemes, graphic or text based overview and summary screen)?

7.4.3 Search mechanism

Is a search engine provided?

- Is there a search facility on larger sites?
- Is the search facility optimised to help users find what they are looking for?

Is the search engine easy to use?

- Is it easy to use the search engine?
- Is there a simple interface to the search engine and does it give easily understood results?
- Are there consistent labels, locations, sizes and colours for buttons?

Does the search engine provide sufficiently flexible and robust capabilities to formulate the query?

- Can the user define search criteria?
- Does the search engine allow the use of boolean operators?
- Is keyword searching possible?
- Is natural language searching possible?
- Are simple as well as advanced searches possible?
- Does the system allow for field searching (structured fields as well as text fields)?
- Does the system allow for the entry of phrases?
- Does the system allow for variants to allow relaxation of search constraints (such as case sensitivity, stemming, partial matches, phonetic variations, abbreviations, or synonyms from a thesaurus)?
- Can actions be performed by changing a parameter used in the formulation phase, which then immediately produces a new set of search results, i.e. dynamic queries in which users adjust query widgets to produce continuous updates?

How effective is information retrieval?

- Are precision and recall satisfactory?
- Are relevance ranking and weighting of results available?

Can results be reviewed/controlled/changed/manipulated?

- Can users read explanatory messages, view textual lists, manipulate visualisations, control the size of the result set, control fields to be displayed, change sequencing (for example alphabetical, chronological, relevance)?

- Is provision made for clustering (for example by attribute, value, topics, etc.)?

Is refinement of searches possible?

- Does meaningful messages guide users in progressive refinement (for example if the two words in a phrase are not found near each other, is easy selection of individual words or variants offered)?
- Is it convenient to change search parameters?
- Can search results and the setting of parameters be saved, sent per mail, or used as input to other programmes?
- Is there a possibility of query refinement that allows users to narrow their search?

7.5 Design and layout

7.5.1 Design and layout of the website

General impression

- Is the design and layout visually pleasing? Does the website embody aesthetic qualities in terms of colour, design, harmony and appeal?
- Does the website display a sense of its medium?
- Does the website follow good design principles?
- Is the design of the website innovative? Is there evidence of originality and creativity in the visual design and layout?
- Is it conceptually exiting? Does it do more than can be done with print?
- Does the website look and feel friendly?
- Does the design relate to the content/subject matter? Do the design and style enhance information delivery and add to clarity of information presentation?
- Does the design aid navigation?

Is there a balance between the various design elements?

- Is there a balance between visual sensation, text information and interactive links (for example balance of text, images, links, headers, font sizes, white space, arrangement and placement of information and graphics on screens; unity, proportion, etc.)?
- Is white space used effectively and not lengthening pages without any benefit?
- Is there visual contrast between different fonts, text blocks and the surrounding empty space?

Is information organised effectively on screens?

- Are similar things or things seen as belonging together displayed together, enclosed by lines or boxes, move or change together or look alike with respect to shape colour, size or typography?
- Does the header area of the web page contain a prominent title at the top of the page?
- Is important information displayed more prominently (for example, are the most important information/items presented 'first' on pages in the usual reading direction?
- Are important concepts and keywords highlighted/emphasised?
- Is the most important information on one screen with the less important information relegated to auxiliary screens (or are screens crammed with information)?
- Can the horisontal width of pages fit into standard display screens?

Is the length of pages appropriate?

- Is there compact vertical design within pages to reduce scrolling?
- Are long pages (meant to be read online) avoided?
- Is the website free of pages that appear complete on a small screen while important buttons or links are hidden just off the bottom?
- Are long menu pages that require the user to scroll through more than two screens limited?

Can users easily print documents?

- Are single document options available for those files that may be printed or downloaded?
- Can pages or portions of a document be printed separately?
- Are text pages designed to print properly (not too wide)?

Is the principle of simplicity of design followed?

- Is page design simplified? Are interfaces simple and easily learnable?
- Is the home page short and simple?
- Are pages uncluttered and cleanly designed? Does the website contain obtrusive 'frills'?

Is there consistency in design?

- Does the website stick to a standard house style? Is the site based on a small number of pervasive rules that apply throughout the user interface?

- Is the site design built on a consistent pattern of modular units, all sharing the same basic layout grids, graphic themes, editorial conventions and hierarchies of information?
- Are there consistent methods of grouping, ordering, labelling, and graphically arranging information?
- Are screen displays standardised and is there a consistent format for all the screens? Is the same information presented in the same location on all screens and is it formatted in the same way?
- Is there consistency in menu conventions from screen to screen?
- Are colours and backgrounds consistently used?

Does the use of tables contribute to the overall design?

- Are headings of tables distinguished by colour or shading?
- Is the unnecessarily use of borders to delimit tabular information avoided – in 'invisible' tables as well as in 'conventional' tabular material?

Does the use of frames contribute to the effective use of the website?

- Does the use of frames prevent users from bookmarking pages, stop URLs from working, make printouts of pages difficult and cause search problems by search engines?
- Is the use of frames confusing?

7.5.2 Text readability and visibility

Does the choice of fonts and case contribute to readability and legibility of text?

- Are too many typefaces used, destroying the homogeneous character of documents?
- Are the correct font sizes used?
- Is the font (type and size) used consistently?
- Does the design provide for the different ways fonts may be displayed?
- Is text in regular upper and lower case?

Do justification and spacing contribute to text readability and legibility?

- Is text left aligned?
- Is the space between lines acceptable?
- Is there consistency in the use of settings such inter-paragraph spacing?

Is the length of text lines comfortable to read?

Is emphasis appropriately applied?

- Are more important items emphasised?
- Is the use of emphasis consistent?
- Is emphasis over-used?

Is colour well balanced, well contrasted and appropriately applied?

- Is colour exploited to provide effective and pleasing screens?
- Is colour-coding limited and colours used conservatively, i.e. not too many colours?
- Are colours 'dither-proof', i.e. are colours clean in most browsers?
- Is the use of several highly saturated colours, opposing colours (like yellow and blue or red and green), or extreme colours (for example yellow and purple) that are displayed simultaneously limited? Are bold, highly saturated primary colours avoided except in regions of maximum emphasis?
- Is the use of blue for text that is not clickable avoided? Is the use of red or purple for text avoided?
- Are non-standard link colours avoided?
- If colours are used to code information, is a legend provided?
- Are existing conventions capitalised on? (Do colours of graphics representing the real world represent the everyday counterpart? Are common cultural colour associations violated, or implicitly assumed?)
- Can the website be used without the colours?

Do backgrounds enhance the visibility of text?

- Are distracting or cluttered backgrounds or other visual elements avoided (for example, are screaming or warm colours used as background colours, are backgrounds busy or patterned)?
- Are there colour and tone contrast between text and background? Does type contrast with background colour?
- Is the display of critical information exclusively in the background avoided?
- Is a monochromic background used to display a colour image?

7.5.3 Graphics, images and animation

Are graphics, images, and animation relevant, professional and used with discretion?

- Do graphics contribute to the clarity and usability of the information (or are graphics impeding on the ease of finding information?)
- Are large graphics imposing too long loading times for pages?
- Are there too many small graphics on one page?
- Does the user have the option of turning off the automatic loading of graphics?
- Do images support ease of navigation? Are graphics used to attract attention to target areas?
- Are graphics described (for example by means of the ALT tag)?
- Are legends short, unambiguous and distinguishable from other text?
- Are thumbnails used to represent images that are too large to be downloaded without a specific user request?
- Are the size, colour and animation of images appropriate?
- Are animation and sound used only when necessary?
- Is the site fee of animation that distracts from or competes with text (for example scrolling text, flashing text, animated gifs, server-push animation)?
- Is a freeze frame mode provided where the user will be able to select a frame and freeze animation, in order to study it in greater detail?
- Are alternative displays with fewer graphics and animation made available? (If large graphic menus and/or animation are used, is there an alternative text orientated view?
- Is too much use of horisontal rules or blank lines to separate items avoided?
- Are special visual effects distracting from the readability of the information?
- Is the use of bold, italics, blinking and other attention-getting devices limited?

7.5.4 Interaction (forms)

Does the use of forms allow the user to easily interact with the web developer?

- Are feedback links fully operational?
- Are command buttons visible when needed? Is it easy to select command buttons or hyperlinks?
- Can users change information they have entered in a form before they submit it?
- Are delimiters used to separate different fields, and is the standard delimiter selected and used?
- Do field labels indicate what data should be entered?
- Does field labels look different from data fields?
- Does the ordering of data entries follow the logical sequence in which the user is expected to think of them?

- Are helpful default values provided?

7.6 Purpose and audience

7.6.1 Purpose of the site

Does the website fit the purpose or discipline thereof, namely that of a government site?

- Does the website serve its intended purpose?
- Does the content fit the purpose?

7.6.2 Audience of the site

Is the website appropriate for its intended audience/s?

- Does the website conform to important user categories/market segments? Does the site accommodate diverse users?
- Does the website have an understanding of the users' needs and behaviour? (Is the content related to the users' needs? Does the site make provision for the information needed by the user and which is considered valuable? Does it provide for users that look for something in particular? Does it provide for users that are in a hurry and need information as quickly as possible? Is the content organised by the needs of the user? Does the information architecture/structure mirror the way the users think about the content and not reflect an internal hierarchy or how the company internally thinks about the content? Does it conform to their motivations, goals and purpose for visiting the site?)
- Is the website appropriate for the target audience? (Are the purpose/mission of the website, subject matter and information, treatment of information and the level of the website appropriate for the target audience? Does the website conform to their experience and expertise? Does the site reflect an understanding of how users do their work? Does the site make provision for the users' hardware and software – can a usable form of the site be accessed by all the browsers that the intended users are likely to use? Does the site make provision for the users' communication infrastructure – for example low-bandwidth access? Does the site make provision for the users' knowledge of computers or websites? Does the website make provision for users with handicaps – for example if a graphic menu system is used for navigation, are there text-based alternate menus to aid disabled users?)

8. CONCLUSION

This chapter provided a discussion of criteria, guidelines and principles for quality websites, and also presented a consolidated list of these criteria with more detailed indicators for each. Web developers may use this list as a checklist against which to measure a website's complicity with general usability requirements

The website guidelines and principles presented in this chapter offer a model of good usability practices for the design of any website. The criteria stress that the crucial element of an effective web presence is content that is comprehensive, current, of high quality and authoritative, that is well written, caters for the needs of a wide range of audiences, and fulfills the publishing institution's communication and information dissemination objectives. Furthermore, the criteria demonstrate that good website content is enhanced by developing a site that is easy to use, offers easy and intuitive movement through the site, and on which information is easy to find through both browsing and searching. Lastly, the criteria also offer advice on achieving a visually attractive site that does not distract from the content, but enhances information delivery through visual and functional continuity, graphic design and typography, and a careful systematic approach to page design.

While the author attempted to provide a comprehensive list of guidelines, it must be kept in mind that any single website will not necessarily have to conform to each of these guidelines. As stated by Nielsen (1993:16), each final user interface will look different. In the final instance a good website will be a combination of good practices for that particular website.

Together with the guidelines and criteria for government websites presented in the next chapter, the author used the criteria and guidelines presented here in developing the test instruments that were used for the evaluation of the *SA Government Online* website (see chapter two).