South African Journal
of Information Management
[DoE accredited]

Peer Reviewed Article Vol.7(2) June 2005

Evaluating South African government Web sites: methods, findings and recommendations (Part 1)

H. Korsten
Department of Information Science
University of Pretoria
Pretoria
South Africa
hilda@gcis.gov.za

T.J.D. Bothma
Department of Information Science
University of Pretoria
Pretoria
South Africa
tbothma@.up.ac.za

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Key words: Online government, South African government Web sites, *South Africa Government Online* Web site evaluation, e-government

1 Introduction

These articles report on research that was conducted into South African government Web sites, with the aim of contributing towards improving the quality and effectiveness of online information and service delivery by the South African government. To reach this broad objective, the effectiveness and usability of the *South Africa Government Online* (www.gov.za) Web site was assessed in detail, while South African national government Web sites was assessed in more general terms to identify issues that the government will have to address to improve the effectiveness of these Web sites.

The aim of this series of two articles is to report on this research. This article discusses the need for government Web site assessment, indicates the criteria and evaluation methods selected, describes the development of test instruments for the evaluation of the *South Africa Government Online* Web site, provides the main findings for this research and reaches conclusions on the criteria and methodology used. The second article will report on the methodology and findings of the audit of national government Web sites. The main conclusions that were reached about the state of government Web publishing in South Africa will be conveyed, and recommendations will be made about initiatives government could implement to improve the quality of government Web publishing in South Africa.

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2 Background

The South African Government has committed itself to provide information to all sectors of the population. The right to information is guaranteed in the Constitution (South Africa, Parliament, 1996), while one of the objectives of the *Promotion to Access to Information Act* (South Africa, Parliament 2000:1) is to 'actively promote a society in which the people of South Africa have effective access to information to enable them to more fully exercise and protect all of their rights'. Also, President Mbeki and other government leaders stated the government's commitment towards an informed population in several speeches and media statements. Important principles emphasized are that government has an obligation to provide information to the people, not only to be informed, but also for the exercising of their rights, that dialogue between government and its citizens is an important part of government communications, and that government should define mechanisms for the public's access to information in the hand of the state (Korsten 2001:102).

The South African government commenced with creating a legislative, regulatory, policy and institutional framework for the electronic dissemination of information after 1994. It also embarked on a number of initiatives to give effect to policies and legislation in this regard (Korsten 2001:113). One of these is that government departments started to make use of the Internet as a communication and information dissemination medium and, at the time this research was conducted, there were 36 national and provincial government Web sites. In addition, the Government Communication and Information System (GCIS) launched a 'single window' Web site, *South Africa Government Online*, to contribute towards making information resources that are available in government easily accessible.

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3 Need for government Web site assessment

Eschenfelder, Beachboard, McClure and Wyman (1997:174) argue that government information management policies that address issues associated with the dissemination of printed publications may not be practical for governing electronic information dissemination via the Web. They present three fundamental questions that arise from government's rapid transition to Web-based information dissemination (Eschenfelder *et al*. 1997:174):

- Are government Web sites being operated in a manner consistent with existing government policies?
- Are new policies needed or should government information policies be updated to more realistically reflect the capabilities of this medium? If so, in what areas are new or updated policies required?
- Are government bodies effectively employing the Web as an information dissemination channel?

Bertot, McClure, Moen and Rubin (1997:373) reason that as government bodies allocate additional resources to the development and maintenance of Web-based services, they should continuously consider what problems users encounter during their sessions on a Web site. Hernon (1998:437) states that any government should have the objective of improving the effectiveness of government programmes and public accountability by promoting a new focus on results, service quality and customer satisfaction. Therefore, in relation to information resource management and Web publishing, it becomes essential 'to go beyond counts of the number of hits that a website receives' to the users of information, their information needs and expectations, information-seeking behaviour and satisfaction with the services provided. In addition, Hernon (1998:441) argues that it is necessary to encourage government-wide assessment of Internet services to be able to recommend specific improvements so that these services can better meet user needs.

Reasons why South African government Web sites needed to be evaluated and improved may be seen against the general issues raised in the previous paragraphs. Reasons more specifically related to South African government Web sites are as follows:

- The official Web site of the South African government, *South Africa Government Online*, was launched on 28 January 1999. Although continuous improvements had been implemented since its launch, evaluation was necessary to serve as framework for improving it, as 'a website is a dynamic construction that cannot be left alone' (Clausen 1999:85). Since the launch of the Web site, it had developed rapidly in terms of content and functionality, and it became necessary to determine if, where and why people might have difficulty with the Web site.
- Continuous scientific usability engineering practices were not followed during the development of government Web sites.
- Were the Web sites meeting user needs? Clausen (1999:85) reasons that a regular and continuous user-orientated evaluation of a Web site must be done with reference to the adjustment of the Web site to as many users as possible.
- The South African government did not have any direct policies or guidelines in relation to Web publishing at the time government Web sites were developed. However, even though formal policies in relation to Web publishing did not exist at the time this research was conducted, evaluation and improvement of government Web sites may contribute to an outcome where the Web sites conform to government communication strategies and the improvement of information dissemination.

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4 Defining evaluation

Preece (1993:108) defines evaluation as follows: 'Evaluation is concerned with gathering information about usability or potential usability of a system in order … to improve features within an interface.' According to Macleod(1994:3), the purpose of evaluation may be to shape design (or redesign) to meet users' needs, to identify and diagnose problems, or to evaluate implementation (for comparison with other designs and for acceptance testing). Gordon (2000) considers common motivators for usability evaluations to be 'checking whether a user can collect specific information to perform certain tasks'.

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5 Parameters in which the research project was conducted

The aim of the research was to evaluate the Web sites for content issues as well as for usability. Regarding content, the objective was to assess government Web sites with regard to general content criteria, against criteria for the specific type of product being evaluated, namely South African government Web sites and, in the case of *South African Government Online*, also as a portal/gateway to other government information. With regard to usability, the objective was not to cover the full spectrum of Web site usability, but to get answers on whether users could find the information they required, which aspects of the interface worked well and which not, and what problems and difficulties users may have experienced with the interface. The concern was both initial usability for first-time users and efficiency and satisfaction for frequent users. For the purpose of this study, usability was assessed with regard to site level usability (home page, information architecture, navigation, search, linking strategy, overall writing style, page templates, layout and site-wide design). Criteria that consider specific issues related to individual pages, as well as aspects such as accessibility, downtime, downloading time of pages, coding problems and error messages, were not considered.

While the authors realize the importance of government's obligation to disseminate information to the broad spectrum of the South African population, the focus of this project was not to assess the Web sites from the perspective of potential future users (for example people with no Internet exposure, people from the rural areas, the broader population or illiterate South Africans). The evaluation was therefore done from the premise that the user population of the Web sites at the time of the evaluation consisted of people with at least some Internet experience, including therefore mainly users from the following sectors: government/parastatal/statutory, educational institutions, students, library and information resource centres, the media, non-government organizations, the general public (literate) and international users.

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6 Criteria for the evaluation of government Web sites

6.1 Identifying evaluation criteria

In accordance with Nielsen (1993:91,92), different levels of criteria were developed for the evaluation of *South African Government Online*, namely general guidelines applicable to all user interfaces, and product-specific guidelines for the individual product that was being evaluated. Furthermore, this evaluation was based on one of the mainstreams of evaluative activities as identified by Ciolek (1996), namely 'the creation of checklists or 'toolboxes' of

criteria that could be used to evaluate websites'.

Identification of criteria was done in three phases. In phase one, a wide range of sources that attempt to specify features of a good or quality Web site or that provide principles for user interface design was consulted. Among these were compiled lists, periodicals, journals and other sources dealing with Web sites, online rating services and guidelines for the design and construction of high quality Web pages. This process yielded a preliminary list of evaluation criteria and indicators.

In the next phase the criteria and indicators were edited, synthesized and consolidated. Duplication was eliminated and items with ambiguous meaning clarified. Items that were meaningless, that could not be operationally defined, or which did not seem relevant to the type of Web site that was evaluated were eliminated. The relevant items were then grouped in five broad categories and 17 sub-categories to yield a standard criteria list against which Web sites can be measured. Each sub-category presents a series of more detailed indicators that may assist the evaluation process.

The third phase entailed the identification of guidelines specific to the product being evaluated, namely the *South Africa Government Online* Web site as a government Web site and as an entry point to other government Web sites. Few sources provide specific criteria or guidelines for the development or evaluation of government Web sites, and specific guidelines or policies for the development of South African government Web sites did not exist at the time of this research. It was therefore decided to provide a set of particular requirements or guidelines to be used in conjunction with the general criteria. To determine these, government policy documents were studied to determine government's requirements for electronic information dissemination and for Web publishing in particular. A literature study was also conducted to identify general criteria and guidelines for government Web sites. Sources that discuss, describe or assess specific government Web sites were utilized for this study. Guidelines selected from these sources understandably did not yield comprehensive information on usability issues, but mainly addressed content issues. They enabled and strengthened the objective and thorough evaluation of breadth and depth of information, and contributed to determine the applicability of a Web site for its intended target audience.

6.2 Overview of main criteria selected

The general criteria demonstrate 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 need of a wide range of audiences and which fulfils the publishing institution's communication and information dissemination objectives. Furthermore, the criteria demonstrate that good Web site content should be enhanced by developing a Web site that is easy to use, offers easy and intuitive movement through the Web site, and where information is easy to find through both the browsing and searching behaviour of users. Lastly, the criteria provide guidelines for achieving a visually attractive look and feel that does not distract from the content or functionality, but enhances information and service delivery through visual and functional continuity, graphic design and typography and a careful systematic approach to page design. Specific requirements for making the content of government Web sites available include that they must be convenient and easy to use, and aesthetically pleasing. Another important aspect that emerged was the need for a 'whole-of government' approach to any government's Web publishing effort and the importance of such an approach for improving the efficiency and quality of government Web sites overall. [A complete list of the criteria and discussion thereof can be found in Korsten (2002).]

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7 Selection of evaluation methods

The process to select appropriate evaluation methods included a literature study of Nielsen (various sources), Preece (1993), Macleod (1994), Clausen (1999), Bevan, Kirakowski and Maissel (1991) and Gordon (2000).

According to Clausen (1999:83), at least three groups of methods are used for the evaluation of Web sites, namely automatic procedures, exclusively quantitative methods and qualitative/heuristic methods. This approach is supported by Nielsen (1993:223) who recommends not relying on a single usability method to the exclusion of others. He states that usability methods should 'supplement each other, since they address different parts of the usability engineering life cycle, and since their advantages and disadvantages can partly make up for each other'. It was thus concluded that the application of a single method to the exclusion of others would not provide complete answers to the research problem.

Other factors that influenced the choice of evaluation methods include the number of users who were available for the evaluation (Nielsen 1993:225), the purpose of the evaluation, external limitations imposed on the evaluation process, the stage in the development process and the time and resources available (Bevan *et al*. 1991:2).

The following evaluation methods were selected for the evaluation of *South Africa Government Online*:

7.1 Heuristic evaluation

Nielsen (1993:155; 1994a) defines the term heuristic evaluation as 'a systematic inspection of user interface design for usability' with the goal of 'find[ing] the usability problems in a user interface design'. According to him heuristic evaluation involves having a small set of evaluators examine the interface and judge its compliance with recognized usability principles, or the 'heuristics'. Preece (1993:111) describes expert opinion as a diagnostic model lying between the theoretical approach taken in analytic evaluation and more empirical methods such as observational and experimental evaluation. She defines experts as 'people experienced in interface design or human factors or both' (Preece 1993:111).

7.2 User testing

According to Preece (1993:112), expert evaluation cannot capture the variety of real users' behaviour. Congruently, Nielsen (1999) states that the best method to gather usability data is to observe real users as they use the Web site to accomplish real tasks. Furthermore, 'user testing with real users is the most fundamental usability method and is in some sense irreplaceable, since it provides direct information about how people use computers and what their exact problems are with the concrete interface being tested' (Nielsen, 1993:165). Heuristic evaluation was therefore complemented with user testing.

The research made use of the discount usability engineering approach as described by Preece (1993), Nielsen (1993, 1994) and Gordon (2000). This entails involving a small number of real users, giving them typical work tasks and combining it with a verbal protocol where they were asked to think out loud while they perform the tasks.

Nielsen (1993:18) states that it is possible to apply this method effectively to evaluate user interfaces with a minimum of training and that 'even fairly methodologically primitive experiments will succeed in finding many usability problems'. According to the Nielsen-Landauer cost-benefit model (Nielsen 1994), the maximum benefit-cost ratio is achieved when using between three and five users. Nielsen (1998) states that a usability test with five

users will typically uncover 80% of the site level usability problems.

7.3 Online survey

According to Macleod (1994:7), one of the simplest means of testing usability is to ask users, 'to sample their subjective views'. This is confirmed by Nielsen (1993:209), who states that this is especially true for issues relating to users' subjective satisfaction and possible anxieties, which are hard to measure objectively. According to Macleod (1994:7), this can be achieved in a structured way by using a questionnaire. Properly conducted and analysed, and with due consideration of contextual factors, valid and reliable performance measures can be provided. This method is primarily a quantitative measurement of how usable a system is in the view of the user. A possible limitation of this method could lie in the validity of the response rate. According to Crabtree (2000), it is virtually impossible to construct a viable sampling frame of e-mail addresses. However, general representativeness should not be too big a concern when the survey is conducted among the segment of the population that uses the Internet regularly (Crabtree 2000).

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8 Development of test instruments for the evaluation of *South Africa Government Online*

The test instruments for the evaluation methods chosen were developed in the following way:

8.1 Heuristic evaluation (expert opinion)

Four 'experts' were chosen by using the following principles provided by Preece (1993:111) as guidelines:

- To ensure an imparial opinion, the experts should not have been involved in the development of the system under evaluation;
- the experts should have suitable experience; and
- the tasks undertaken by the experts should be representative of those intended for real users.

A semi-structured evaluation guide was compiled and provided online. It was based on the criteria list referred to in 6.2 above and included the five broad usability criteria, each with a few indicators to define it. Preece (1993:112) refers to such a guide as 'predefined categorisation'. This approach is consistent with Nielsen's (1993:19) recommendation to use a small set of broader heuristics or basic usability principles. The intention with choosing this form of reporting was to provide a platform that invited spontaneous comments and suggestions from the evaluators.

The evaluation was conducted during the period 23 August to 8 September 2000. The evaluators were asked to use the Web site and then to evaluate it according to the usability principles as presented in the evaluation guide. They were asked to consider additional usability principles and to describe potential problems they envisaged users might encounter.

8.2 Heuristic evaluation – critical evaluation of the Web site

The second part of the heuristic evaluation was a critical evaluation of the Web site by one of the authors. The Web site was compared against the criteria list with the aim of determining to what extent the Web site complied with them. The evaluation was conducted from 23

August to 8 September 2000.

8.3 User testing

The aim of the user tests was to determine which aspects of the interface were good and which were bad and how it could be improved. To collect qualitative feedback and not quantitative, a task-based analysis was done through collecting feedback on how users tackled the tasks given, where major difficulties were experienced and what could be done to improve the Web site.

In accordance with the discount usability engineering approach, five respondents were tested. Care was taken to ensure that the five users were representative of the most common user populations, that is, 'average' users and not improbable users (Nielsen 1993:175). The respondents were selected to have various levels of Internet and *South Africa Government Online* experience, and to be from different age groups and different genders. This provided a mix of individuals with varied skills and experience.

Work tasks were chosen to be representative of the actual use of the Web site and to provide reasonable coverage of the most important parts of the user interface. The tasks were based on the intended use of the Web site, usage statistics and observation of how users actually used the Web site. Tasks were put in writing to ensure that all respondents received the tasks described in the same way, and to allow them to refer to the task description during the test.

To ensure that respondents interpreted the questions or tasks correctly, the user guide was subjected to pilot testing before the actual evaluation was done. Two pilot subjects were used, one with high exposure to the Internet as well as to *South Africa Government Online*, the other with average experience of the Internet and no experience of the Web site. Thereafter the tasks were revised to fix difficulties found during the pilot activity and to ensure that the test instrument was easy to understand and to apply.

The user tests took place during the period 14 to 21 August 2000. Tests were conducted individually for each respondent in his or her normal work environment. Each respondent was tested for approximately 60 to 90 minutes. During the test, respondents were asked to give their initial impression of the home page and then given the opportunity to explore the Web site freely. Directed tasks that required them to find some specific information on the Web site were then given to respondents. They were allowed to ask questions in order to minimize the risk of misinterpretation. During the test respondents were encouraged to verbalize their thoughts. This verbal protocol was used to obtain a wide range of information, for example the user's planning for the particular task, what he or she was doing with the interface and why he or she was doing it, and to recall commands and arguments by the user during the test (Preece 1993:114).

Contrary to the traditional thinking-aloud method where the procedure is videotaped, the experimenter took notes: 'In discount usability engineering we don't aim at perfection; we just want to find most of the usability problems' (Nielsen 1993:18). Problems the respondents experienced, suggestions on how to fix them and specific quotes from the respondents were documented.

After completion of the tasks, respondents were asked to complete the satisfaction questionnaire and they were then debriefed.

8.4 Online survey

An 18-item questionnaire was compiled and presented interactively on the Web site. Despite

being mainly a quantitative measuring instrument, provision was made for qualitative questions as well. A combination of open and closed questions was included to allow respondents not only to select answers from a choice of alternative replies (quantitative), but also to provide them with the opportunity to give reasons for certain answers (qualitative). The questionnaire made use of the multi-point Likert rating scale to measure the strength of agreement against clear statements. Questions focused on information coverage, currency, ease of finding information on the Web site, 'look and feel' and preference with regard to search versus browsing techniques.

The questionnaire was subjected to pilot testing before it was implemented. It was digitized before pilot testing took place to ensure that the pilot test was conducted in a situation as close to real-life as possible. The same two pilot subjects chosen for the user test were used. They were requested to complete the online questionnaire and submit it electronically. They were then debriefed. After the pilot test the questionnaire was revised to correct difficulties experienced by the pilot subjects.

The questionnaire was made live on the Web site on 14 August 2000 and was kept on the Web site until 16 September 2000, thus for a period of almost five weeks.

8.5 Scheduling of activities

To synchronize data gathering activities for the different methodologies, all activities were scheduled to take place within the same period (14 August to 16 September 2000). Care was taken that data gathering did not take place over a period where heightened interest in the Web site could have influenced frequency of user visits or satisfaction with information on the site.

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9 Assessing the criteria selected and methodology followed

The research indicated that the criteria and guidelines represented a comprehensive and workable list suitable to address the research objectives. They offer in the first instance a model for good usability principles for the development of any Web site, and this list (or a shortened version thereof) can be used as a checklist against which a Web site may be measured to determine its compliance with general usability requirements. In the second instance, the guidelines for government Web sites provide a framework against which government Web sites may be developed and measured, and are a particularly valuable guide for content and some of the architectural issues that should be addressed on government Web sites.

The research indicated that the four methodologies used were generally successful for the purpose of this research. The combination of heuristic evaluation methods with the user test and the online survey provided comprehensive findings with regard to all criteria considered, identified major problems with the interface as experienced by 'real users', and provided valuable insights with regard to users' perceptions of the Web site. Since all four methods revealed most of the deficiencies of the Web site, there were definite areas where the findings of the respective evaluation methods confirmed each other. However, in some cases findings reflected the view of one or some of the respondents or evaluators, or one or some of the evaluation methods. Most of these aspects were relevant concerns and deficiencies and, together with the issues identified by two or more evaluation methods, should be regarded as aspects that ought to be considered for the improvement of the Web site.

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10 Overview of findings for the evaluation of *South Africa Government Online*

The findings of the evaluations that were conducted during the period 14 August 2000 to March 2001 indicated that many aspects of the Web site were satisfactory and that, on the whole, the Web site fulfilled its purpose. However, the findings also revealed that the Web site did not conform to various usability criteria and to expectations for government Web sites in each of the broad areas of usability criteria applied, and that the Web site did not sufficiently provide users with a mechanism to optimally find all the information they needed.

Important aspects identified for improvement were comprehensiveness and currency. The findings revealed that both the breadth and the depth of information were not satisfactory and that the currency of the Web site did not meet expectations. The handling of the What's New feature on the Web site was also strongly criticized.

The findings further revealed that important aspects contributing to difficulty in finding information were illogical organization of information, fragmented presentation of information, and that the Web site did not optimally provide access structures according to users' mental models of information organization. This resulted in information that was hidden and difficult to find, and in users not finding information where they expected to find it. The findings demonstrated that the organizational structure also had an effect on the overall navigation structure of the Web site, as an illogical and inconsistent organizational approach will necessarily influence the navigation approach and consistency thereof.

The research indicated that the search mechanism played a prominent role in those users who normally preferred to search, not finding the information they needed. The difficulty of finding information could also be attributed to the situation where users, because they found the search engine difficult to use, were compelled to browse to find information that would under normal circumstances be more logical to search. Lastly, design aspects were found to be generally satisfactory, but findings showed that attention would have to be given to developing a clear and simple interface.

The findings for the evaluation of *South Africa Government Online* also indicated that respondents had a negative perception of the standard of government Web publishing in general, and that these perceptions negatively influenced their perception of the *South Africa Government Online* Web site. A need was expressed for national and provincial Web sites to have a more standardized approach towards content, navigation, design and options of finding information.

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11 Conclusion

The South African government, as other developed and developing countries, will have to ensure that there is a transition to quality Web-based information dissemination to ensure fair and equitable access to information and services by potential audiences. Government Web sites should be utilized as a tool to disseminate information and services to a wide range of audiences and should be a public relations tool to reach citizens, the media and foreigners, including tourists and investors.

The main objective of this research was to contribute towards improving the quality and usability of government Web sites to enhance the effectiveness of online information and service delivery by the South African government. Government Web sites are intended to be extensive, informational Web sites. This already presents inherent difficulties for the design

and information architecture and therefore has a direct effect on the accessibility of information on the Web sites. In the light of these difficulties, the evaluation of these Web sites required a combination of data collection techniques that supplemented each other to ensure comprehensive and reliable findings that could contribute towards improving these sites.

The findings for the evaluation of *South Africa Government Online* indicated that many aspects of the Web site were satisfactory and that, on the whole, the Web site fulfilled its purpose. However, important aspects will have to be addressed by government to ensure that the Web site conforms to usability requirements and fulfils the needs of users.

The next article in this series will report on the methodology and findings of the audit of national government Web sites. The main conclusions that were reached about the state of government Web publishing in South Africa will be conveyed, and recommendations will be made about initiatives government could implement to improve the quality of government Web publishing in South Africa.

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ISSN 1560-683X

Published by InterWord Communications for Department of Information and Knowledge Management, University of Johannesburg