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APPROACHES TO EVALUATION OF WEBSITES FOR PUBLIC SECTOR SERVICES

Michael Middleton
QUT School of Information Systems
2 George Street, Brisbane, QLD, Australia
m.middleton@qut.edu.au

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ABSTRACT

A brief review of developments in evaluation of e-government Websites is undertaken in order to introduce an instrument which is presently being tested for evaluating such sites, and which is available from the author. This instrument enables assessment and comparison of Websites according to criteria grouped under the categories of Security and privacy; Usability; Content; Services; Citizen participation; and Features.

KEYWORDS

e-Government; Evaluation; Websites;

1. INTRODUCTION

Access to government through Web interfaces has become commonplace in recent times as a consequence of pervasive use of the Internet for access to information and services. Governments at national, regional and local levels have pursued opportunities to engage the public through Websites by provision of access to publications and data, participation in decision-making processes, and through interactive services.

Online interactive services may include such facilities as petitioning, rate paying, licensing or information queries. There continues to be a diversity of implementation quality and levels for such services.

The way that e-government may be implemented has been described in various ways. One approach is that of the European Union which has characterized four main tasks: development of Internet-based services to improve access to public information and services; improvement of transparency of public administration by using the Internet; full exploitation of information technology within public administration; and establishing e-procurement (Strejcek & Theilb, 2003).

In comparable fashion the United Nations has also articulated similar but distinct areas: internal processes such as recordkeeping; electronic service delivery; virtual communities for digital democracy; and e-business opportunities. The UN has also produced participation and readiness indexes as indicators of the extent of progress and participation in e-government (United Nations Department of Economic and Social Affairs, 2004). These indexes are among a number approaches to measuring e-government performance.

Janssen *et al* (2004) have compared methods for assessing implementation. They used the term 'supply oriented eGovernment measurements' for evaluations that focus on delivery, typically through the Internet. This is closest to the second of the four UN areas, and is the focus of the following analysis which reviews approaches to Website evaluation and details an example of one instrument which is presently itself being tested for undertaking the evaluation process.

2. WEBSITE EVALUATION

Measurement of e-government must take account of more than the supply orientation. Beyond provision of services, evaluation should be with respect to issues such as internal functioning through Internet development, and application of policy within a regulatory environment. Nevertheless, this paper concentrates upon services. Evaluation in this respect is often segmented either into Website design and evaluation in general, or approaches to examining performance of e-government as delivered via the Internet.

In the case of the former there are many examples of guidance. These may take the form of online checklists (W3C, 1999). There are also many texts on the subject such as those of Lazar (2006), and Nielsen and Loranger (2006) that provide direction in for information architecture and design, style, and quality.

In the latter case, a specific focus may be particular aspects of Website performance applied according to regulatory guidelines such as accessibility for people with disabilities (Evans-Cowley, 2006). Alternatively the focus may be upon user perception of service facility. This has been undertaken using the *eQual* instrument applied to government services (Barnes & Vidgen, 2004). Further, Choudrie and Ghinea (2005) adopted what they called an integrated socio-technical perspective using participant evaluation along with use of Web diagnostic tools for sites of four countries.

These investigations contribute to a growing body of examination of online delivery practices, with accompanying development of measuring instruments. For example Kaylor *et al* (2001) conducted studies on local governments in the USA, and focused on the functions and services that cities typically provide. The model they used contains detailed questions on services delivered online. It also used a 4 point scale system to measure the presence and the degree of implementation of online services.

In Brazil Garcia *et al* (2005) produced an instrument, *g-Quality* for 'inspection' of government Websites. They complemented a Nielsen checklist with additional heuristics specific to accessibility, interoperability, security and privacy, and other elements. West (2005) has developed a method for examining comparative performance of sites. It uses criteria relating to features such as information availability, service delivery, and public access. It is used to provide performance reports for example for internationally (West, 2006).

Five main categories for evaluation of e-government sites are used in an instrument developed by Melitski *et al* (2005). These are security and privacy, usability, content, service and citizen participation. Within these five categories, there are a total of 92 questions, 47 of which use a 4 point scale. These have been developed further in an instrument *egWet* (Henriksson *et al*, 2007) that extends the questions and adds a category 'features' that caters for such aspects as personalization and extended search capability.

2.1 Generic Website evaluation

Methods for Website evaluation based upon the design and architecture principles referenced above use a variety of characterizations. For example Edwards (1998) sees evaluation in terms of access, quality and ease of use. Alexander and Tate (2003-2006) use the criteria: authority, accuracy, objectivity, currency, and coverage, for which they elaborate different sub-criteria for different Website types such as informational sites. Many of the evaluation categories may be consolidated into the criteria that are illustrated in Table 1. These criteria may be briefly outlined as follows:

- *Functionality* refers to how effectively a site is designed in order to help you navigate around it.
- *Authority* refers to the trustworthiness of the information carried at the site, and how reliable it is.
- *Validity* is an indication of the extent to which a site is considered useful by other parties.
- *Obtainability* refers to the ease with which a site may be recalled and displayed.
- *Relevance* accounts for the information requirements of a user and how pertinent to them a site is.
- *Substance* assesses the significance of the site for producing unbiased and reliable content.

2.2 e-Government Service Evaluation

Evaluation questions that are directed to assessment of e-government sites in particular have been incorporated in the instrument *egWet*. It was created following a systematic review of contemporary research

in the area of e-governance along with a review of best practices in Website design. It is being used to test applicability of the derived questions for evaluation.

Literature indicated that it was possible to group the factors thought to influence the quality of government Websites into six major categories: (1) *Security and Privacy*; (2) *Usability*; (3) *Content*; (4) *Services*; (5) *Citizen Participation*; and (6) *Features*.

Five of the categories and many of the *Security and Privacy* questions are based upon those of Melitski *et al* (2005). These have been extended by applying generic Website evaluation material to the government site context, by including an increased number of factors in the categories, and by adding an additional *Features* category. Table 2 gives an example of an element in each category and the type of question that may assist in checking for an element's application.

As with the Melitski *et al* instrument, the grouping of the factors was not undertaken using factor analysis – instead they are simply grouped according to perception of the different interface facilities identified in earlier work, complemented by additional questions itemized by the investigators. The relevant weight given to groupings may vary according to public sector context, and the instrument provides for this.

Table 1: A Summary of generic Website evaluation categories

<u>Criterion</u>	<u>Example of factor</u>	<u>Examples of check</u>
Functionality	Site maps	- Is there a summary of site organization by showing broad categories of pages?
Authority	Affiliation	- Is an organization responsible for governance of the site?
Validity	Referring links	- How many other sites provide links to this one?
Obtainability	Format support	- Does the site require 'plug-ins' for full functionality?
Relevance	Currency	- Is there an indication of how frequently it is updated?
Substance	Evidence	- Are statements supported by illustrations or quoted sources or linked Websites?

Table 2: Summary of e-government evaluation categories

<u>Category</u>	<u>Example of element</u>	<u>Examples of check</u>
Security/privacy	Privacy policy	- Does the Website policy explicitly state the use of personal data in relation to third parties?
Usability	Disability access	- Is the Website W3C standard priority 1 compliant for vision-impaired users?
Content	Public information	- Does the Website offer access to databases having regularly updated public information
Services	Business	- Does the Website offer online registration?
Citizen participation	Business	- Does the Website offer online survey or opinion polls?
Features	Personal Pages	- Can these be customized based upon characteristics /preferences of individual users?

Categories may be briefly described as follows:

- *Security and privacy* is concerned with the existence and quality of any privacy policy presented on a government Website. It takes into account security of data transmission to the site and the site's servers. Internal security measures taken within a department itself are also of interest.
- *Usability* is the broadest of the six categories, and derives mainly from the generic *functionality* category. The areas examined range from the readability of a Website's text fields, to whether the site employs a consistent style through the usage of cascading style sheets. The ease of using the Website's navigation system is estimated, and the robustness of forms encountered is assessed. As government sites are intended for general public use, overall accessibility is embraced and takes into account disability access, and backward compatibility with older systems.
- *Content* is judged on the amount of public information available on the Website. The amount of horizontal integration between various government agencies is also assessed, along with an estimate of the amount of information available about the dealings of these agencies.
- *Services* comprise two sub-categories: services for citizens, and services for businesses. In each of these sub-categories the availability of payment, registration and application services is observed. Online tendering by businesses, and online recruitment for citizens is also considered.

- *Citizen participation* examines the extent to which citizens are able to communicate both with the government agency and with each other through the Website. The availability of opinion polls, bulletin boards and satisfaction surveys is observed.
- *Features* Included within this category are assessment for: availability of personal pages and the degree to which the government agency allows each citizen to create their own space.

3. INSTRUMENT DEVELOPMENT

A spreadsheet outlining an initial group of questions was developed based upon existing literature. Interviews were then conducted with relevant personnel from each of the three levels of government in Australia. These interviews along with test evaluations of the Websites with which they were associated, were used to refine the test instrument.

The instrument was distilled to 106 questions that were tested on the Websites at each level of government. It was found that about 80% of the questions were answerable without the assistance of any person with insight into the workings of the government agency itself. However, some questions, could only be answered by a person with insight into the agency's workings.

Of the questions, 91 are dichotomous (yes or no). The other 15 questions are evaluated according to 7 different scales. For the purposes of testing the instrument, some dichotomous questions were given greater weight. However, relative weighting of questions may be varied to suit application emphasis.

3.1 Instrument scales

The scales used for different questions vary according to the criteria employed. For example, a service offered by the government agency online is ranked as nonexistent, displayed, downloadable, partially executable or fully executable. Readability scales (Lei, 2005) are tested on the Help, History pages and Privacy Statement pages respectively.

Each of the scales is embedded within the evaluation instrument, which also includes an inbuilt manual.

3.2 Instrument weights

In developing an overall score for each government Website, the Features category is weighted at 10% of the total and each of the other 5 categories is equally weighted at 18% of the total. This balances to some extent the different number of questions in each category. However the user of the instrument may reset the relative weights of categories to suit their own purposes.

When calculating the weighting of each category, points associated with questions not answered or not considered to be applicable are excluded from the total sum of points available. This is done to avoid Websites receiving lower scores when users of the instrument are not able to find the answer for a particular question, or because the question was not appropriate for that particular site. It is also possible to set a minimum percentage of questions to be answered in any one category for an acceptable rating to be achieved. The default value is set at 75%.

3.3 Instrument limitations

The instrument is presently packaged in a stable spreadsheet format with linked manual of interpretation incorporated. However, it will benefit from further refinements taking into account: establishment of an interactive Web version; regrouping of categories following appropriate user-testing; the need to answer questions beyond those that may be determined by interactive site testing; the legal environment to which an agency is subjected – as it stands there is no account taken of information or services that are not applicable in a specified regulatory environment; assessing quality of services that go beyond Website characteristics; and the difficulty of evaluating an agency which has sites distributed among a number of host services.

The time it takes to complete a Website evaluation using the instrument can be seen as a limiting factor. To ameliorate this, the instrument requires the assistance of automatic evaluation tools. The instrument has been directed at the evaluation of government rather than commercial Websites. Therefore it does not allow for consideration of such commercial aspects as product description. Receiving a high score doesn't necessarily indicate that a government Website is successful. There are many other factors that also play an important role in leading to public user satisfaction.

4. CONCLUSION

The ability to evaluate government Websites must be refined along with the development of their capabilities. Future development of the Websites must take into account regulatory constraints, and make certain of transaction security. Yet, it must also ensure that a digital divide is not perpetuated, by providing information visibility to users who have a wide range of computer and information literacy.

Although generic Website evaluation instruments are now mature, their adaptation to e-government, requires development in line with the increasing capabilities of those sites, and innovation in public sector facilities. Instruments such as that which has been referred to must be continually refined, taking account of:

- Incorporating Website development standards into evaluation checklists as they are promulgated.
- Refining approaches to scalability of questions, and utilizing automatic analysis tools.
- Balancing factors determined online, and those that require access to informed personnel.
- The legal environment to which a particular government Website is subjected.
- Adapting evaluation to deal with services that implement an approach across multiple sites.

The instrument described is presently being tested on Australian public sector Websites at different levels of government. Because the evaluation criteria are developed from international sources, it may be utilized and tailored for testing government Websites in other countries. It is available for evaluation from the author.

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