ABSTRACT

Private companies have successfully migrated their business to the web medium reaching more customers. The government induced by the potential impact brought by the Web has enforced its offices to migrate their services either to capture or to offer information to the Web in order to become what it is made for: TO THE PEOPLE, FOR THE PEOPLE. This government service migration task is very complex since the amount of users is enormous (ideally all population of a country) and users’ background needs are heterogeneous. In this paper we present a study focusing on the Brazilian effort to provide government services at the electronic medium. We evaluated 127 Brazilian government sites that encompass some federal sites, all capital sites and all municipal sites from the state of Rio de Janeiro. We analyzed these sites considering site usability, accessibility, interoperability, security and privacy, service agility and transparency criteria. Results from our case study have shown that although great effort has been invested (in terms of money, people allocation and bureaucracy policy) the government approach has been erratic and oriented towards providing hardware (access to all). We advise that unless a unified way of building e-Gov sites is implemented, taking into account the criteria we have delineated here, the whole system may be in risk of failure as citizens will not trust it, and consequently it will be more like a make-up than a technological facilitator to reach citizens.

KEYWORDS

Usability, Quality, Evaluation Web Site, e-Government

1. INTRODUCTION

Electronic government (e-Gov) means the use of information and communication technology to: 1) allow citizens to obtain useful information and services from government; 2) allow government to obtain information from users; and 3) allow citizens to participate in government decision-making process.

Brazilian government services have been migrated at a random order, without any systematic policy, which reflects the inexistence of a strategy for providing services in the digital media. Each city has its own approach to e-Gov. Some of them delegate the migration task to private companies that may have hidden agenda, which could compromise the quality of the sites.

E-Gov sites should offer: a) information, such as calls for financial support proposals; b) services, such as income tax electronic forms; and c) contacts with government, such as discussion forums. Most e-Gov sites are totally informative, which means that the site is 100% informative, 0% service and 0% participatory.

In the government’s pursuit to provide citizens access to government services through the Web, several obstacles, which are clear in the traditional venue when a citizen seeks information, requests a service or wishes to participate in government’s decision-making processes, should be examined in order to maintain existing relationships.

Government sites seem to be directed towards the administration’s interests rather than citizens’ interests. Sites that reinforce state control over society have high priority whereas sites allowing some degree of social control of the administration are postponed. Information gathering and tax collecting are truly enforced but public resources expenditure reports seem to be forgotten.

In the traditional way if a citizen needs a government service, such as handing in the yearly income tax form, he must approach a Brazilian IRS office. Upon its delivery, a receipt guarantees that the document has been duly processed, and he can rely on its security and the privacy of the information provided.
When the government tries to migrate the provision of services to the Web environment – be it to display information, to render services, or to establish participation channels – it must take into account the peculiarities of the traditional means. It must guarantee usability, access and information accuracy, non-repudiation of data, and security and privacy.

The government action process is nowadays decentralized and distributed throughout the three political levels – city, state and federation. Public government information systems follow this model, giving rise to peculiarities, trends and problems in each of the government levels and consequently, in the respective electronic government systems.

Given this context, some questions concerning the usage of government systems in the Internet environment as well as their use by citizens surface. A macro question when evaluating this process is to evaluate how the migration to the Internet environment is taking place. In this evaluation process, seven capital items may be considered as will be showed in section 3.

In this paper, an evaluation process with specific criteria for e-Gov Web sites was defined, and used in the proposed case study to verify the items presented above.

2. G-QUALITY METHOD EVALUATION

This research is based on usability (Nielsen – 1993) and on the e-Ping (Interoperability Pattern of Electronic Government), which is a main document (e-ping – 2004) ensuring that the Brazilian government may guarantee the communication throughout its systems, and on account of its information systems’ diversity, a continuous flow of public data.

To implement the g-Quality method, the features were charted on an evaluation table, with several items, in a manual checklist used by usability experts.

The following section presents a case study in which the assessment g-Quality method is applied to Brazilian e-Gov sites.

3. CASE STUDY: AN X-RAY IN BRAZILIAN E-GOV SITES

In this section, to test the efficiency of the extended heuristic evaluation method for the e-Gov domain, we present a Case Study, including scenario, method implementation and data analysis.

3.1 Investigation Methodology

The g-Quality method was implemented to analyze the quality of Brazilian e-Gov sites, with the following breakdown: 9 federal sites, 91 municipal sites (all of them in the state of Rio de Janeiro) and 27 municipal sites (from Brazilian state capitals).

3.1.1 Participants and testing environments

The method was implemented by seven specialists in the Post-Graduate Program of Computer Sciences of the Universidade Federal Fluminense, between September and November 2004. The assessment team took a course to discuss usability inspection methods and the evaluation criteria to be used for the e-Gov domains, as well as the manual checklist.

The assessment tests were performed within the premises of the Universidade Federal Fluminense, in a computer environment with Windows and the browser Internet Explorer.

3.1.2 Assessment Tools

In order to have the assessment process standardized a manual checklist was used by the assessors. This checklist included items such as:

- Site compliance with W3C recommendations;
- Document under patterns xml, swx, rtf, pdf, txt, htm or html;
- Digital certification; and
• Contact means other than Internet.

Each item of this checklist is then graded as: (2) – for “always”; (1) – for “sometimes”; and (0) - for “never/option not applicable”.

These numbers were used as multipliers to obtain a global assessment result for each site. The global assessment results were then normalized into a 0-100% scale, so that all results could be easily compared.

Some items of the checklist may be more important than others. In such cases we considered that they were to have an extra multiplier

### 3.1.3 Testing procedure methodology

When assessing the sites, the assessors worked separately. All assessors performed all tests in exactly the same way, following the same set of instructions. Each site was assessed by two specialists who worked independently. As pre-established by the group, the digital migration was measured based in the existence or not of certain types of information, service, or participation resource. The evaluation was divided into two phases, described bellow:

- **Evaluation Prototype** - The first step involved evaluation prototype, which enabled detection of possible inconsistencies. Four external specialists, as well as the course students, used the checklists to evaluate a chosen government site, the results were compared in order to assess the checklist’s objectivity and necessary adjustments were made. These tests were not taken into account in the final analysis.

- **Evaluation** - In this phase the assessment team performed the assessment tests of the sites using the checklist. Once all sites were assessed twice, the assessment team came together to analyze the results obtained and then validate the final results.

### 3.2 Data Analysis

The data collected in the assessment of the 127 government sites was extensively worked, and the analysis was conducted with focus on the seven hypothesis previously established.

1. *The greater the income per capita in a city, the greater is the degree of e-Gov migration.*

The wealth of a city is not an indicator of the development of its government electronic systems. Figure 1 shows the profile of the Brazilian municipalities according to their Per capita GDP. In 5,561 municipalities the distribution of the GDP is highly concentrated in a few of them.

![Per Capita GDP graph](image)

*Figure 1. Per capita GDP*

Figure 2 shows the 25 highest municipal GDPs in the state of Rio de Janeiro. The 26th highest GDP is in Petrópolis (R$ 6.63), and the lowest is in Trajano de Moraes (R$0.94). The segment in between has an average municipal GDP of R$2.68.
The cities with the highest Gross National Product per citizen within the Cities of Rio de Janeiro, where we verified that:

- The town of Porto Real/RJ is the second highest Per capita GDP within the 5,561 Brazilian cities, with an annual Per capita GDP of R$ 278,420.13. It’s the highest Per capita GDP among the municipalities of Rio de Janeiro. On several attempts to access their homepage, the forbidden access message was displayed:
  When we did access the site, it proved to be simply informative, offering no services or participation tools, containing only institutional data and downloadable files.

- The town of Quissamã/RJ is the eleventh highest GDP per citizen within the 5,561 Brazilian towns, with an annual Per capita GDP of R$ 115,339.09. Their homepage contained institutional data, legislation and norms, files for downloading and links to other sites, fulfilling the informative role. In the services category, the site offered only Web-mail, which was intended for the city hall staff’s use only, unavailable for citizens. In the participation category, the only available tool was their e-mail. We should note that the e-mails sent to the towns of Porto Real and Quissamã were not answered.
  What seems to be happening there is that the towns with high GDPs originating from large companies are focused in attending to these large contributors, thus failing to provide the proper attention to the common citizens.

2. The government complies with well-known Internet domain registration regulations in the composition of their URL.

We verified that the government sites do not follow the basic Internet norms in the composition of their URL (domain creation). We searched the sites through a search engine, considering the domain.gov.br. If the search returned no results for this particular domain, we considered the ones that were found (.gov and .org), checking on their official quality later on. In relation to the sites from the State of Rio de Janeiro, of the 91 towns, 51 had sites with rj.gov.br domains, 7 had sites with other domains (.org or .com), 24 sites were found only referred to in unofficial sites, 4 sites were in construction and 5 not found. Considering the available data on the site http://www.brasil.gov.br, we found that 41 towns are listed, of which 27 are from the rj.gov.br domain, 4 are from other domains (.org or .com), 3 are in construction and 7 not found. There is no consistency between what is officially informed by the federal government and what actually exists, and in both cases the standard domain formation is not observed. These inconsistencies, however, were not found in the federal and state sites.

Several cities had their sites created by government employees (or group of employees) own initiative. In these cases hosting is often within “available” sites, usually in “.org” or “.com” domains (Figure 3), having no correlation whatsoever with the actual destination of the site.
3. The government is effective and agile towards citizen’s requests.

As we examined the government machine, we could observe that slowness and inefficiency are present in the three levels of government in the Internet. In this environment people are used to agility. Delays in answering requests, as in a simple e-mail will make users lose confidence, as well as tolerance, in the site. Our sample showed 81.25% of the e-mail requests are not answered.

Internet services have often been established mainly because it’s fashionable and because there is an interest in displaying a modern high-tech look. Within such a frame of thinking, once a self-exalting page is created the Administration need not bother with services being offered for they would only bring trouble to its routine.

4. e-Gov sites reflect the government guidelines concerning universal accessibility.

As can be seen in figure 4 we verified that the government (federal, state, or city) shows no concern in making their sites flexible, with contents that are accessible to the people with special needs, or offer accessibility in different environments. All these difficulties represent a big problem once we consider that government should be, by nature, accessible to all.

As a great portion of the government sites are intended for announcements and publicity there is no interest in targeting any specific public. The mere creation of the sites seems to be just enough to please their creators. Public in this case is mere accessory. People with special needs are regarded as people who bring extra trouble without much return.
5. The government uses open standards for data exchange, thus ensuring accessibility to all citizens, as well as interoperability of data.

In Brazil, the Federal Government (e-ping – 2004) determines that data be made available through different patterns.

Nonetheless we noticed that data exchanges between government systems and users take place mostly by using property patterns in all government levels, as can be seen in figure 5

![Figure 5. e-Gov Web Sites – non-Open Systems](image)

A certain degree of experience with working with computers is needed when using open software. The Administration must be aware of the alternatives, having analyzed the situation, and to adopt an option that is both politically and economically suitable for the open software. Without awareness of the problem one cannot expect awareness in the solution.

6. Security is a priority in e-Gov sites.

In a broad perspective we may say that security is not a priority in any of the three levels e-Gov web sites. Personal information needing confidentiality does not travel in the Web safely, as digital certifications are not always available. This is a fact that interferes directly in the rapport between citizens and government systems, as it creates an uncomfortable situation when obtaining and providing information, for security of data and privacy are not guaranteed.

Computer security is nearly inexistent in any environment for it isn’t culturally established in society. In any fairly civilized setting, information security is protected by the “concentric circles”. “Minding other peoples’ business” is condemned in all societies through the so-called Social Protection. The consuetudinary good sense conventions have established the so-called Administrative Protection. The physical barriers (safes, etc.) form the Physical Protection. Cryptography provides Logic Protection. In computer environments such forms of protection are eroded. Social Protection does not exist, as “minding other peoples’ business” cannot be eye-sighted as it takes place in each terminal, in far away places. And people will not even feel guilty for doing it. Physical Protection vanishes with the web connection of computers. Administrative Protection isn’t effective yet, as authorities don’t even know what to protect, what to prohibit, or what to permit. It seems that the Administration is not concerned with investing in security because it simply ignores the vulnerabilities.

7. Citizens’ opinions are electronically received.

We also verified that federal, state, and city governments display no interest in making tools that enable electronic citizen participation available, We know that by providing opportunities for people to participate in a democratic process, the government will be indirectly giving them more power. We checked the sites for the following tools that enable participation: e-mail, Chat, Discussion Group, Voting, and Work Group.

Citizen participation, being essential for evolved democracies, is in fact based in power sharing. The power and the rights of a community are finite resources. Whenever there is distribution, some people will get more then others. The Administration holding the most rights, will not likely to be willing to share their rights and franchises. E-mail, search tools and voting polls are overwhelming in information in e-gov sites.
Regarding postings of information and services in the Web, we verified that these have been provided within a wide range of scope, with relevant information for the public. On the other hand, citizen participation and interaction with government through the Web are still quite restricted, for government decision-making process doesn’t seem to take into account the public opinion-expressing possibilities offered by this means. Citizen participation is restricted to the possibility of expressing one’s opinions through e-mail (and, still, not always this option is available), and voting in closed polls.

3.3 Discussion of Results

The present study has detected trends and serious problems that may jeopardize the migratory process of government systems into the Internet environment, as much as its use by the citizens. A macro view of the migration process reveals that although many towns already have their pages in the Internet, only a few of them provide service rendering, such as calculation and printing of payment bills, such as for the Urban Real State Tax, for instance. We also verified that efforts are still feeble regarding implementation of environments that would enable citizen participation. In most cases fundamental principles such as security, standardization, and service agility are not being considered priority, causing interaction problems between citizens and systems. To make the point one can see Brazilian Payment System allowing real time inter bank money transfer and Internet income tax system maximizing the revenue and minimizing the delays. These experiences attend government interest sites and are well succeeded. But ID card replacement and passport issue still obtain inexpressive results. A lot has been said about the need to expand technology infrastructure to promote digital inclusion. Nevertheless, the present paper has revealed that such need may not be the greatest difficulty, since the portion of the population that does have access to Internet still find many difficulties when trying to access information and use services provided by government agencies through the Internet.

4. FINAL CONSIDERATIONS

This study discusses the results using g-Quality method. It can be verified that the inclusion of specific features (accessibility, interoperability, security and privacy, information trust and precision, service agility, and transparency) enables a more thorough and in-depth inspection.

Such features - accessibility, information reliability and service agility - are absolutely necessary for the implementation of a viable electronic government system, which users trust and feel at ease with.

We observed the existence of sites that purport to be official but are, in fact, business-oriented, portraying a totally distorted image of electronic government. Another issue that should be highlighted is the lack of security of government sites. Provision of government services depends on strict security. Therefore, this criterion is extremely important since citizens interacting with these systems need to feel totally secure.

During visits to sites evaluated in this research, it was verified that, in spite of the slow digital migration, available information and services were far-reaching and relevant to citizens. Citizen participation and their interaction with the government on the Web are still quite restricted, as government decision-making has not yet considered the possibility of checking public opinion through these means. Citizen participation is limited, in most instances, to expressing opinion via e-mail (though we verified that this option is not always available), and voting in restricted polls.

A detail that was observed referred to the need of consistency in the wording used by different sites. This consistency would enable a more intuitive navigation – when users are acquainted with the language, search is facilitated.

When we raise issues that are relevant to the citizen, along with the government, we will be able to establish a set of measurements to evaluate e-Gov sites, so as to provide better quality. We hope that this research can contribute with the process by raising new indicators to improve electronic government systems.
REFERENCES