

# ELECTRONIC GOVERNMENT IN BRAZIL

## *Evaluating Brazil Initiative*

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Keywords: e-Government, Accessibility, Usability, Interfaces.

Abstract: This article presents an overview of a major e-government site in Brazil, the Transparency Portal, and makes a comparison with electronic government of some other countries, in order to assess the degree of accessibility of each site. To obtain the results, the validation tools ASES, DaSilva and TotalValidator were used to evaluate the sites based on e-MAG, WCAG v1 and WCAG v2. A survey with entities, NGOs and ordinary users is also presented, and aims at evaluating the Transparency Portal according to criteria such as navigation and ease of use. These assessments will be used as suggestions for improving the Brazilian site and make it easier to use and accessible to a greater number of citizens, regardless of educational level and specific needs.

## 1 INTRODUCTION

The Electronic Government (or e-gov) is a new form of government that can be understood from three different viewpoints: the government itself, which brings advantages such as greater ease in dissemination of laws, decisions, regulations and more efficient service provisioning; to the entrepreneur, enabling fast and simple access to the offered services, agility and transparency in the negotiations with the government; and to the individual citizen, who also has easier access to services in a convenient, fast and cheap way (Satyanarayana, J., 2010).

To achieve its objectives, the e-government has principles such as to allow access to databases of the government and to deliver services truly transparent, efficient and convenient. These services can be offered through the use of information technologies and communication technologies (ICTs) (Satyanarayana, J., 2010), which can reach a large number of people including groups like elderly, young, people with special needs and others distant from government centers. Restrictions of each group must be identified, and applications and infrastructure tailored so that all groups can finally participate of the government.

The aim of this paper is to compare e-government sites according to accessibility standards recommended by the World Wide Web Consortium (W3C) and evaluate the Transparency Portal, a

leading e-government site in Brazil, according to the usability criteria. The paper is divided as follows: in the "Related Work", some works that try to ensure the usability for all are presented. In "Accessibility and Usability" the respective terms are conceptualized. Next, the section "Transparency Portal in Brazil" provides assessments of accessibility and usability of a leading e-government site in Brazil. In the section "Comparison to Other Portals", the Brazilian site is compared with other e-government sites around the world. Finally, we present the "Conclusions".

## 2 RELATED WORK

The use of Organizational Semiotics is proposed by Vânia Neris (2010) to understand the different interactions with the various potential public of the interfaces and then use the concept of customization to tailor the interface for each. The work proposes the use of a framework called PLuRal which is based on three pillars: the identification of user needs, definition of features that will be offered, and determination of the possibilities of adaptation based on the anterior pillars.

Frederick Fortuna (2010) proposes a framework for building interfaces based on Ajax and Norms. The framework does not require reloading pages, it infers user behavior and allows users to have a better experience with the application. The framework

contains a perception module, which captures the user interactions, a SOAP client for loading the rules, and an action module, responsible for making the change in the system according to a plan of action drawn from the Norms. Finally there is a storage module of the events generated by users (for future reference) and modules for storage of Inferences, Norms and creation of action plans. Sites like the Transparency Portal (in Portuguese “Portal da Transparência – [http:// www.portaldatransparencia.gov.br](http://www.portaldatransparencia.gov.br)) does not require registration, making inferences based on previous experiences difficult.

Bruna Burr (2010) believes that one way to encourage the participation of citizens in the political movement is through conversations related to areas of public interest. She defines a process as "a sequence of inter-dependent actions that consume one or more resources to convert inputs into outputs", and the discussions around the process. The work focuses on the first levels of democratic participation (where the initial levels represent the population's access to information and the upper levels represent the very public participation in decision making, as a direct democracy). Based on the responses, the services offered can then be improved.

Anne Veenstra and Arre Zuurmond (2009) reinforce the idea that e-government is not just offering services online but should include personalized services to citizens. Accordingly, departments of one or more organizations should cooperate to offer services as a unique view to citizens, no matter which number of departments would be involved. Consultants, government officials and specialized sites were used as sources to identify the relationship between variables related to the factors of organizational change (eg, aligning IT to business, vertical or horizontal organization, internal/external management, non-duplication of activities, technology deployment and systems, among others) and quality of service offered. The results showed that yes, there is a relationship between some factors of organizational change and quality of service, and the factors related to information technology in large part impact the measures of the quality of service.

### 3 ACCESSIBILITY AND USABILITY

e-Government aims at the development of applications with good usability and accessibility,

here understood as the requirement that applications can easily be accessed and understood by the entire population. Whereas accessibility allows information to be obtained even by those with special needs, a good usability ensures that the path to obtain the information will be found in an objective and easy way. Usability testing should be made to identify the interface more suitable, especially when considering the needs of different users.

Accessibility is a requirement in applications developed by the Brazilian Government since December 2004 and a standard called Accessibility Model for Electronic Government (e-MAG, in Portuguese “Modelo de Acessibilidade de Governo Eletrônico”) (DGE, 2005) is the reference to be followed. The current version 2.0 was released in December 2005 and is based on Web Content Accessibility Guidelines (WCAG) standard. Usability, in turn, does not have a legal obligation in Brazil. However, it involves fundamental principles such as effectiveness and efficiency in information search, satisfaction of use, frequency of errors and memories of previous experience (DHHS, 2010). Accessibility is still a keyword to W3C, which in its specification for HyperText Markup Language (HTML) 5 (W3C, 2009) mentions the creation of accessible pages as part of its scope.

Accessible applications and appropriate usability lead to a greater participation in government by all and make communication with authorities about local issues easier. An example is the site "FixMyStreet" (MySociety.Org, 2010), in which citizens of Great Britain report problems about cleaning and lighting, among others. Electronic Government challenges to the population also exist: the site "Apps for Democracy" (iStrategyLabs, 2010) stimulates a contest with prizes for the identification and resolution of the main types of problems that can be treated by ICTs.

### 4 TRANSPARENCY PORTAL IN BRAZIL

In Brazil, the General Control Agency (In Portuguese, “Controladoria-Geral da União”) released in November 2004 a Transparency Portal website in order to expose all the expenses of the executive branch of the Brazilian government in one place. The initiative intended to strengthen the defense of the public heritage and to increase the transparency of public management, roles performed by this agency, through the so called "Popular

Control" of federal spending. A view of the current interface of the portal can be seen in Figure 1 and the site requires no registration for information to be queried in order to encourage its use by the entire population.



Figure 1: Current interface of the Transparency Portal.

#### 4.1 Difficulties

Although there are tips and instructions for accessing the data, it is hard for the average citizen to know where to start searching ("direct expenditures" or "transfer of funds"?) or even understand the classification of expenditures displayed ("function", "subfunction", "program", "action", among other things). This difficulty is mainly caused by the lack of technical knowledge of citizens about the terms of budget execution. Moreover, some segments with greater technical knowledge, as control agencies and organizations, can find information easily and even prefer the division of expenses in the way they are detailed in the budget. The current approach can not be totally discarded, but there should be a complement to allow customization of the information to the regular user.

#### 4.2 NGOs Evaluations

Aiming at getting different views on the Transparency Portal, a survey was made with entities/non-governmental organizations (NGOs) which work in the areas of transparency, corruption combat and engagement of citizens in government actions. The objective of research was to evaluate the adequacy of the portal interface and its use by such entities. The result showed that these entities have no navigation problems and even feel there is a

lack of more technical details. The questions are listed below:

*I - The entity uses the Transparency Portal in any way in encouraging the fight against Corruption?*

All organizations surveyed answered they use the site, in proportions ranging from consultation only the spending on payment cards (official credit cards, information not available in other sites) to congratulations for its completeness. When partially used, other sites like Follow Brazil (In Portuguese "Siga Brasil" - [http://www9.senado.gov.br/portal/page/portal/orcamento\\_senado/SigaBrasil](http://www9.senado.gov.br/portal/page/portal/orcamento_senado/SigaBrasil)) (with details of expenses of the branches Judiciary and Legislative) are used to complement the information.

*II - On the Transparency Portal being an official tool for the dissemination of public spending, the organization misses any data or facility not available?*

There were considerations of no exposure of expenditures of State Companies, the means used to acquire the products and (more specifically related to credit cards) the description of the goods purchased. One factor raised more than once was the difficulty in making crosses of expenditures. This reason has even been a cause to the use of other sites.

*III - It is difficult to use / find the data on the Transparency Portal? Is it slow? Is navigation user friendly?*

The usability of the site has been praised and navigation classified as even very easy. These evaluations were complemented with accessibility tests made with specific tools and are discussed in the following section (section "Comparison with other Websites"). Finding the data was considered a simple task and the navigation of portal quick.

As NGOs showed satisfaction with the portal usability, they were not asked to participate in the next experiment. The experiment uses two developed prototypes and is described as follows.

#### 4.3 Evaluations by Common Users

Aiming at obtaining views of ordinary users about the usability of the Transparency Portal, two prototypes were created, one proposed according to the technique of card sorting (DHHS, 2010) and the other reflecting the current structure of the site. In the first prototype, using the card sorting, twenty-five of the most common queries available at the site were listed and users were instructed to gather the information in the way they considered most

appropriate. This experience showed that if to NGOs users the data were easily found, ordinary users expect to find the information on a completely different place. The prototype generated can be seen in Figure 2 and proposes a simplification of the official version.



Figure 2: Prototype based on card sorting.

In the second prototype, shown in figure 3, the intention was to obtain a mirror of the current interface of the Transparency Portal. This prototype resembles the one generated by card sorting. The official site, available on the Internet since 2004, was not used so that a fair comparison could be achieved with the experiment. Selected users do not previously know the official website of the Brazilian Government. This requirement was important as prior knowledge of the site would lead to a false easy navigation in the model representative of the current interface. The order of evaluation of the two prototypes was also alternated, one time the prototype of proposed model (card sorting) being the first to be evaluated and other time the prototype of the current interface being the first.

Participants received instructions about what was the objective of the test and also what was the Transparency Portal. Each participant should find in the two prototypes specific information about government spending but not in the government portal itself. Difficulties in obtaining the answers would be faults on the organization of information. There was no time limit, the counting would start individually for each question until the user said the answer was found.

A total of five questions were asked and should be answered for the two prototypes. No significant differences in response time related to the order of evaluation of prototypes were found. Among the selected users, including the ones involved in the development of card sorting, there were students, lawyers, language teacher, police investigator, civil

servants and retirees. The test reinforced the idea that tabs (like in browsers) needs to be used with caution because in some cases much of the time spent in searching was used in recognizing the tab. Another factor that has been proven is that although the availability of various search options (ways to reach the information) may facilitate queries to the advanced user, the average user is penalized for not knowing which option to choose.

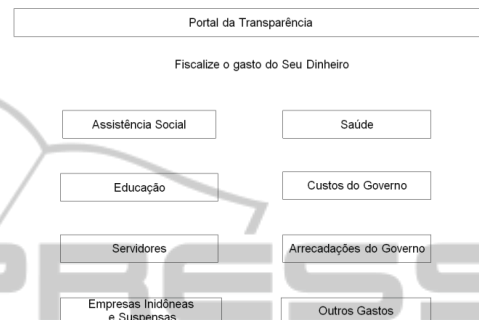


Figure 3: Prototype of the current Transparency Portal.

The questions are presented below and demonstrate information that can actually be obtained from the Transparency Portal:

*I - What are the beneficiaries of the social program called Family Grant (in Portuguese "Bolsa Familia") in the city of Castanheiras? (fictional town)*

*II - How much and for whom it was the spending on maintenance of health centers at the "Hospital das Clínicas" hospital?*

*III - What are the public servants of the Ministry of Education?*

*IV - How much was the incoming of the government with Taxes and Fees?*

*V - How much was spent by the Federal Government with the public agreement for implementation of Digital Inclusion Centers?*

Each of the five questions was assessed against four criteria, listed below, and the test results can be found in tables 1 and 2. With the exception of Public Agreement consultation, for which there is a specific section in the current model of the Portal and the card sorting technique grouped according to the area of the agreement operation, all other consultations showed significant improvements in the proposed model. This model was considered more appropriate for all users of the test, and the improvements were obtained due to the simplified view of the prototype.

Each of the previous questions were analyzed according to the following aspects with results presented in tables 1 and 2:

*I - Success in obtaining the data (regardless of what navigation path followed).*

*II - Total time spent on the question.*

*III - Ease of navigation (grades 1-4 assigned by the user, with 1 being very difficult and 4 very easy).*

*IV - Navigation paths traversed until the user says that information has been found.*

Table 1: Average success, spent time in seconds, facility and paths taken by users to obtain the requested information - the original model.

Question	Success	Time (s)	Facility	Paths
"Bolsa Família" social program	100%	126,4	2,6	4
"Hospital das Clínicas" maintenance	0%	82,2	2,6	3,8
Servants of the Ministry of Education	20%	72,4	3	2,8
Taxes and Fees	100%	25,8	3	1,2
Digital Inclusion Centers agreement	100%	17,8	3,4	1,2

Table 2: Average success, spent time in seconds, facility and paths taken by users to obtain the requested information – proposed model.

Question	Success	Time (s)	Facility	Paths
"Bolsa Família" social program	100%	19,8	3,6	1,2
"Hospital das Clínicas" maintenance	100%	14,6	3,8	1,2
Servants of the Ministry of Education	100%	8,2	3,8	1,2
Taxes and Fees	100%	4,6	4	1
Digital Inclusion Centers agreement	80%	31,8	2,8	3,2

#### 4.4 Proposed Improvements

The Transparency Portal falls short of its goal with the current interface, as demonstrated in the evaluation with regular users and even organs and entities that have technical knowledge about the budget. Whereas the former may have a difficult

navigation, due to technical terms, the latter have difficulties especially related to cross-checks and the lack of information on the expenses of other powers. The cross-checks limitation, linking of data, could be circumvented by the availability of the so-called "raw data" such that data of the consultations would be available in its original form (without treatment). Although there is an option to download spreadsheets with some of the display data in the Portal, the information is not complete.

Aligned with the considerations of Anne Veenstra and Arre Zuurmond, the Transparency Portal should show the data of the three powers (legislative, judicial and executive). The fact that the General Control Agency is an agency of the executive should not be a hindrance to the development of a portal vision of a single-service consulting for government spending. Regarding the difficulties of using the interface (common user), customizable user interfaces with the use of Norms would lead to greater ease of use by citizens and especially to a greater identification of irregularities in public spending. This would also ease the process of facilitating discussion of public policy because the public would know better how their money is being spent. At the same time, advanced users would not be harmed because the interface would also be adjustable to their skill levels.

With the increasing prevalence of smart phones, the mobile government should also be considered in the Transparency Portal. Queries to their databases should be available in a manner optimized for these mobile devices. Moreover, modern features like GPS could and should be available to consult expenses wherever the citizen is. Only this function would be a great facility and citizens could oversight the funds invested in his city or even his neighbourhood and street only with basis in the GPS position. There would be no more need of budget expertise to find information. Another possibility would be realization of online denounces with the despatch of proofs by the device itself.

Coupled with the possibility to adapt the site so that more frequent consultations are more easily available, voting could be used so that the citizen feels part in building a more dynamic portal, sending their positions to changes that could effectively be seen in the portal. Regarding the definition of public policy, beyond votes on approval or disapproval of expenditures that may direct the government on how to invest its funds, platforms for identification of trends of opinion (Rafael Tavares, 2010) could be used to assess the predominate trends about contrasting actions/policies.

## 5 COMPARISON WITH OTHER SITES

The Transparency Portal can be considered the main site of the Brazil Federal Government for the disclosure of their expenses. However, by its own characteristic, there is no concentration of all the features of electronic government. The e-government portal in Brazil (<http://www.governoeletronico.gov.br>), Brazil's Government Portal (<http://www.brasil.gov.br>) and also sites of the various bodies that comprise the Federal Administration have other services. To compare the state of the evolution of electronic government in Brazil, a review of other sites in Brazil and abroad will be made, taking into consideration the provision of services, level of detail of expenditures and means of access.

The e-government portal of Singapura (<http://www.ecitizen.gov.sg>) is shown in Figure 4 and is distinguished for offering a wide range of services for day-to-day citizen needs. Services such as issuing passports and accident reports, medical appointments and payment of taxes are available online. Payment is simple and even credit cards can be used. Additionally, there is information for services that can not be made electronically and the option for mobile devices. Brazil has some of the services offered (eg: police report), but not the same facility for transactions involving payments. On the other hand, there are more details of public spending in the Brazilian site.

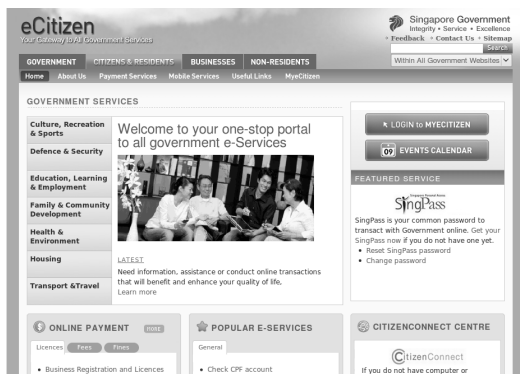


Figure 4: Interface of the Singapore Portal.

The South Africa site (<http://www.services.gov.za>, figure 5) provides integrated services for citizens, organizations and foreigners, and works as a means of official communication for documents, events, laws and general information (you can, for example, refer to the country constitution,

understand its organizational structure or obtain a study about the prison system). The services part of the portal allows queries using SMS, but most services do not allow the online resolution but gives guidance on how people should proceed to get what they want, usually including a visit to a physical position of the government. No detail of the public spending is shown and the Brazilian government page offers an official means of communication more updated. Africans documents on the other hand seems more simple, facilitating the involvement of the population.



Figure 5: Interface of the South Africa Portal.

The government of Dubai provides a site (<http://dubai.ae/en.portal>) with nearly four hundred online services to the public and entrepreneurs, ranging from permission to visit shrines to recruiting services. The site, shown in figure 6, has as objective the strengthening of local economy (providing better services for organizations) and lower costs of public administration (reducing the need for staff and physical posts). Alternative means of access such as SMS and email facilities are provided and include payment by credit card. The number of online transactions executed passes 2 million (Lootah, H, 2006), for an estimated population of 1.5 million. In comparison, the Transparency Portal in Brazil recorded in its release about 1.8 million visits to their pages, to the estimated population of 180 million. Like Singapore and South Africa, Brazil has a higher level of concern with the disclosure of public spending.

A site that deserves mention as a government initiative is the Chile site (<http://www.gobiernodechile.cl>). The Chilean government's has as principle that it is responsible for creating the need for e-gov services (Budge, E., 2003). Online processing of documents, fees payment and buying needs are some of the facilities provided.

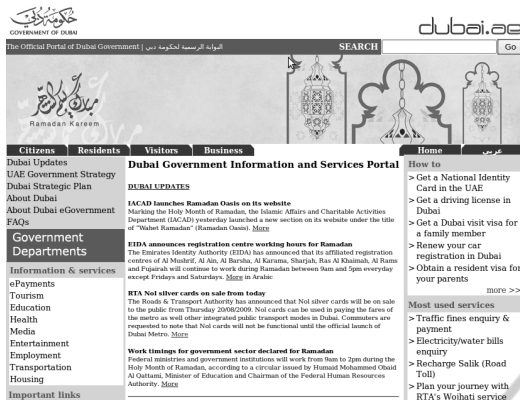


Figure 6: Interface of the Dubai Portal.

### 5.1 Comparison of Accessibility by ASES and DaSilva

ASES, Evaluator and Simulator for Accessibility Sites (In Portuguese, “Avaliador e Simulador de Acessibilidade de Sítios”), is an official tool released by the Federal Government of Brazil on its electronic government home page for verification of compliance with the standard e-MAG. The e-MAG standard is based on the W3C WCAG v1 (W3C, 1999) and specifies the obligations and recommendations to be observed by all government sites regarding accessibility. Three priority levels are defined: in level 1, the failure to implement a requirement prevents the accessibility of the site for at least one group of users; level 2, obligations not observed are significant obstacles to accessibility; level 3, obligations not implemented may create difficulties (DGE, 2005). The recommendations generally require a certain subjective judgment by the developer and are not evaluated in this article. ASES found some false errors such as no identification of labels for certain HTML tags, that were not considered. The site DaSilva is an updated version of the ASES, available for use on the Web and, as ASES, identifies the same types of errors.

The Transparency Portal was the chosen site for accessibility comparison with other official government sites as it has greater visibility in the country. It showed good compatibility with the requirements assessed by the ASES. For the pages evaluated, only one flaw (easily resolved) of priority level 1 was found. It was an image that showed no textual equivalent description (e-MAG Recommendation 1.11). For priority 3 flaws, there was the use of outdated tags (e-MAG Recommendation 3.1). There were no failures of priority 2. Because of the legal obligations for e-MAG accessibility in Brazil, it can be concluded that

care has been taken in the development of the site.

The site of Singapore, in turn, presented a series of problems regarding the requirements set by e-MAG. Besides several figures without corresponding description, dimensions were specified with absolute values (e-MAG Recommendation 2.2 violation), inaccessible frames (e-MAG 1.16 Recommendation violation), lack of language definition (e-MAG Recommendation 1.1 violation), among many others. The portals of South Africa and Dubai have shown similar problems as Singapore’s, and, therefore, low accessibility with respect to e-MAG. As these sites are from other countries and not governed by Brazilian laws and obligations, failures to conform with e-MAG standard were expected. Table 3 shows the total errors per site evaluated for an average of 5 different pages each.

Table 3: Distinct accessibility errors by e-MAG/ASES (evaluation of five pages for each site).

Site	Priority 1	Priority 2	Priority 3
Transparency Portal (Brazil)	1	0	1
Singapore Portal	6	4	2
South Africa Portal	3	4	2
Dubai Portal	5	4	2

### 5.2 Comparing Accessibility with TotalValidator

The online tool TotalValidator (<http://www.totalvalidator.com>) was used to check compliance of the websites with the standard WCAG v2 AAA (W3C, 2008) and identified a greater number of errors in all evaluations. This difference occurred both in the number of different errors identified as in the reduction of false errors raised by ASES. Instead of priorities levels, TotalValidator, following the rules of the W3C, has three levels of "success criteria". For Level A accessibility, tools can be used to make the site accessible. In the AA level, there is greater support for assistive technology and also facilities for those who do not have such technology. The AAA level improves the support for assistive technologies and also to the common access.

The Transparency Portal had a lower performance in this new analysis. As examples of issues not previously considered are duplicate identifiers and lack of possibility of explicit change context (submit button). Error as the lack of textual description of figure was again identified. A total of seven distinct errors were found, all of level A

“success criteria”. The other sites once again underperformed the Transparency Portal. Taking into account that this time all countries assessed were not obligated to comply with WCAG recommendations, the tool may be considered fairer to evaluate the sites mentioned. Table 4 shows the individual versus total number of errors found for each site examined.

Table 4: Distinct errors // total errors of accessibility by TotalValidator (evaluation of five pages for each site).

Site	Criteria A	Criteria AA	Criteria AAA
Transparency Portal (Brazil)	7 // 37	0 // 0	0 // 0
Singapore Portal	9 // 168	1 // 136	1 // 1
South Africa Portal	8 // 160	1 // 43	0 // 0
Dubai Portal	17 // 455	2 // 109	1 // 2

## 6 CONCLUSIONS

The article presented a comparison of accessibility of international e-government sites. Different countries without tradition in the area were chosen in order to achieve a fair comparison of current e-government evolution. The results showed that among the sites evaluated, the Brazilian site has the highest compliance with W3C standards, which represents a good result especially when considering the order of absolute errors found.

A questionnaire was also presented with answers of entities / NGOs regarding the use of the Transparency Portal (Brazil). The purpose of this research was to find out whether there was recognition by organizations about the e-government effort, any difficulties not yet identified, and especially getting responses from opinion leaders about the accessibility and ease of navigation of the site.

Another evaluation, now with ordinary users of different profiles, was performed and aimed at obtaining insight about the Transparency Portal by people who have no technical knowledge of public budget. Two prototypes were created and the evaluation showed that one of the prototypes, developed in accordance with the technique of card sorting, had performance far superior than the other. To match both ordinary users and NGOs / Agencies, the Portal should then allow alternative views of information through the use of customization. One fact raised was that even using the card sorting, one consultation was better accessed in a different path

than the one suggested by the technique. These assessments will be used as suggestions for improving the Transparency Portal site, in order to make it easier to use and accessible for all.

## ACKNOWLEDGEMENTS

The authors wish to thank the site “Contas Abertas”, the “Transparency International”, the “Instituto de Fiscalização e Controle” and the United Nations Office on Drugs and Crime for participation in the evaluation of Transparency Portal.

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