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The Usability and Content Accessibility of the E-government in the UK

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Abstract

This study investigates the usability and content accessibility of today's UK e-government websites and investigates whether they are ranked high in terms of accessibility and usability and if these two measures are correlated. The usability and accessibility of fifty selected UK e-government websites were measured using two automatic evaluation tools: Bobby and LIFT. Based on these automatic evaluation results, ten selected websites were further evaluated with expert evaluation methods: heuristics evaluation and cognitive walkthrough. Assistive technology was also used in the evaluation to assess the accessibility issues. The results show a relatively high compliance with the Web Content Accessibility Guidelines and a relatively low usability rating for most UK e-government websites.

1 Introduction

The UK government recognised the advantage of the Internet and its surrounding opportunities. Electronic government (e-government) was implemented and it is described as the electronic delivery of public services to citizens through the Internet and the World Wide Web. The main goal of the e-government is to enable citizens to carry out more transactions or dealings with public agencies 'electronically' (Dunleavy and Margretts, 1999).

As e-government websites are the gateways for the public to access information and services provided by the government in the information age, the e-government websites have to be easy for all citizens to use, including those with disabilities, and therefore, universal accessibility is a crucial issue in their design. The number of people with disabilities is expected to increase significantly in the next decade as the UK's and world's population is rapidly growing older, and the number of Internet users of old age also increases exponentially. This leads to the need that website designers have to cater the issues of content accessibility when designing websites.

In this study, an analysis and evaluation of the usability and content accessibility of the UK e-government websites is conducted to investigate whether the e-government is actually providing not only better quality public services directly to citizens, but also universal access of the services through the Internet and enables citizens to carry out more transactions or dealings with public agencies 'electronically'.

The suggested improvements and guidelines established in this study aimed to provide suggestions to the government that enables them to produce e-government websites that are both usable and accessible to the blind and other people with disabilities.

2 E-government and Web Accessibility

Government agencies wishing to provide a service through any channel must make it equally available to every citizen. According to the Global e-government Survey conducted by World Market Research Centre and Brown University (2001), there is only 2% of government websites worldwide that have some form of disability access and only 7% of the e-government websites were accessible. The needs of all citizens must be considered equally. Otherwise realisation of the idealistic vision of all citizens being able to interact freely with a responsive government through a multitude of technological channels runs the risk of increasing social exclusion and the technologically literate will increase their advantage by monopolising direct access to government (Poskitt, 2002).

3. Methodology

3.1 Data Collection Methods and Analysis

Fifty UK governmental websites were chosen to be assessed and evaluated upon their accessibility and usability. The fifty sites were mainly based on the results generated by a search engine. Results from the keyword search 'gov.uk' from <http://www.google.com> search engine were collected. The office of the e-Envoy (<http://www.e-envoy.gov.uk>) website which does not appear in the Google results was included among the selected sites because the office of the e-Envoy leads the drive to get UK online. It is therefore, an interesting exercise to assess the usability and accessibility of this website as this would serve as a good indicator to how usable and accessible the UK e-government websites are in general.

The two research questions of this study are:

- 1) Are e-government websites in the UK rated high in terms of usability and accessibility?
- 2) Are the results of accessibility evaluation of e-government websites in the UK related to the result of their usability evaluation?

To answer the research questions, several statistical analysis techniques were adopted. For the first research question, the means and standard deviations of the accessibility and usability ratings of the fifty selected e-government were calculated. Selected top and bottom tier e-government websites based on the results from the automatic evaluations will then be taken into further investigation by conducting heuristic evaluations. Also, expert evaluations with the use of assistive technology (JAWS for Windows) will be employed to the selected top and bottom tier e-government websites for further investigation. For the second question, bivariate correlation for all analysed websites was calculated to determine whether accessibility and usability are related.

3.2 Results and Discussions

The results show a relatively high compliance (62%) with the Website Content Accessibility Guidelines (WCAG) (<http://www.w3.org/TR/WCAG10/>) as suggested by Web Accessibility Initiatives (WAI) (<http://www.w3.org/WAI/>) and there is a low usability rating (a rating of 1.78 on

a 1 to 3 scale) for most of the UK e-government websites. The accessibility approval was found to correlate significantly with overall usability ratings of the websites. Table 1 provides a qualitative representation of the obtained significant correlations between accessibility and usability.

High Usability/Accessibility	Low Usability/Accessibility
<ul style="list-style-type: none"> - Office for Data protection - Department of Trade and Industry - Intellectual property - OFT – The office of Fair Trading - The Official website for the Mayor of London and the Greater London Authority - Home Office for the UK - Employers Organisation - Office of the deputy prime minister - Improvement and development agency - National Assembly for Wales - Department of Transport 	10 Downing Street

Table 1: Concordance/Discordance Summary of Sites on Usability and Accessibility

The size (in Kb) of the website was found to be a driving variable both for usability and accessibility. Nielsen (1997) suggests that websites should have sizes of 8K for optimum response time (1 second response time) with ISDN connection speeds. Results showed that the UK e-government websites evaluated on average are nearly 6 times higher than the optimal response time for ISDN users. Furthermore, the average downloading time is still relatively slow meaning that users may become impatient waiting for the page to display and might end up giving up and turning back to traditional methods (i.e. by telephone or call in person) for government information.

In the heuristics evaluation, results are converted into a binary variable with ‘0’ representing ‘Not approved’ and ‘1’ representing ‘Approved’ status with each usability heuristic. Table 2 shows the correlation between heuristics and individual Bobby results and the correlation between the heuristics and individual LIFT results. The results show that there is a low correlation between Bobby and the heuristics but there is a relatively better correlation between LIFT and the heuristics results. In particular, the correlation between the heuristics results and LIFT significant problems results is 0.52.

Bobby			LIFT		
P1	P2	P3	Significant Problems	Major Problems	Minor Problems
0.18	0.07	0.08	0.52	0.19	0.19

Table 2. The Correlation of Bobby and LIFT with Heuristics

The expert evaluation with cognitive walkthrough aimed to find out potential problems users might experience with the UK e-government websites with the use of assistive technology – JAWS for Windows (JAWS). JAWS automatically reads through the page and it depends on the user control to decide whether he/she wants the screen reader to read out the content of a particular frame and their links. Figure 1 shows the individual evaluation results from the Mayor of London, the London Assembly and the Greater London Authority website (<http://www.london.gov.uk>). The arrows show the screen flow of how the JAWS screen reader reads through the web page. The screen flow enables the blind user to have an overview on the hierarchy of the website.

However, the results in the evaluation show that the screen reader did not clearly provide the user any information about the structure of the web page. Furthermore, users will often find difficulties in navigating the website, obtaining information, completing a task (such as a form) or to perform a search request. Without being able to navigate the web page, it is often impossible to perform a task no matter how accessible the web site is according to the automatic evaluations carried out.

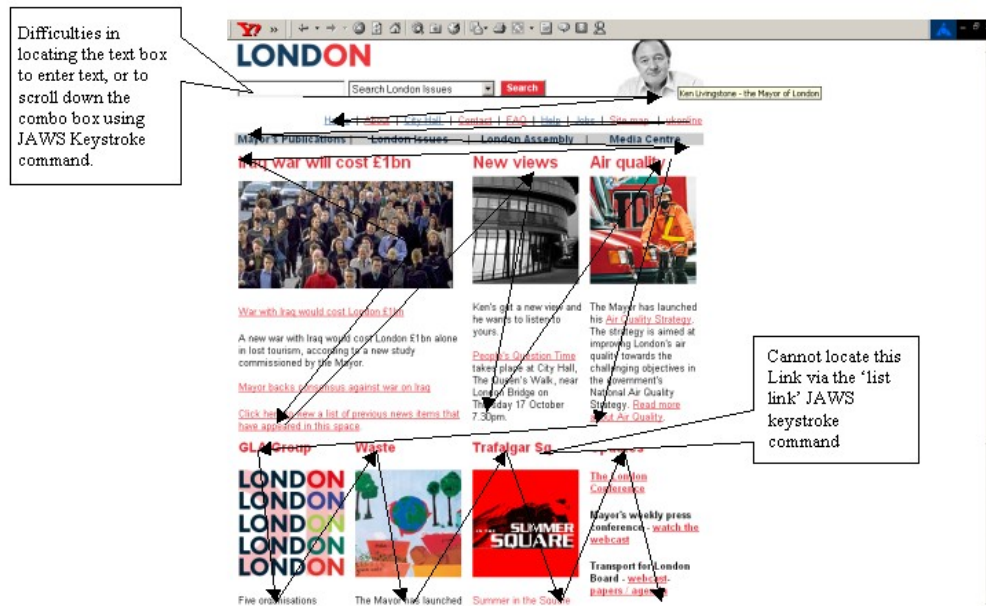


Figure 1: Evaluation of <http://www.london.gov.uk> with JAWS

4. Establishing Design Guidelines for the E-government

Based on the evaluation results in this study, a set of design guidelines were then identified addressing the current usability and accessibility issues to support the development of effective design solutions for the e-government websites. The usability and accessibility checklist developed by the authors is provided below:

1. An "alt" (alternative text attribute), "longdesc" (long description tag) should be provided as a text equivalent for every non- text element or in element content.
2. Provide each frame with a title. The title frames with text that facilitates frame identification and navigation.
3. Provide alternative text for all images. Equivalent alternatives should be provided for any multimedia presentation.
4. All information required for navigation or meaning does not depend on the ability to identify specific colours.
5. Documents should be readable without requiring an associated style sheet.
6. Data tables shall provide identification of row and column headers.
7. Pages shall be usable when scripts, applets, or other programmatic objects are turned off or not supported, or shall provide equivalent information on an alternative accessible page.

8. An appropriate method shall be used to facilitate the easy tracking of page content that provides users of assistive technology the option to skip repetitive navigation links.
9. Background colours will be avoided since colour schemes can create problems with legibility.
10. Multiple browser testing has to be conducted on the current versions of Netscape Navigator, Internet Explorer and Lynx.
11. A text version of the web site should provide in the e-government web site.
12. Use descriptive, intuitive text links and avoid the use of vague references such as "click," "here," & "more" etc.
13. Avoid flying/moving text and the use of '...' in the content.
14. Ensure user has control over the web page at all times. The link 'Home' should be provide in every single page of the site and identical to users.
15. Provide navigation scheme to show users where they are in the context of the site's hierarchy.

5. Conclusions

To summarise, the results from this research found that the UK e-government websites are rated relatively high in terms of accessibility, and the analysed results reveal that a website that is usable does not mean it is also accessible, and vice versa (i.e. the correlation between the two is low).

Accessibility is a subset of usability. Accessibility means designing a user interface that is not only effective, efficient and achieving user satisfaction, but also inclusive of more people in more situations. Usability nowadays often assumes accessibility. However, results from this research found that although accessibility is part of the usability issues, having a high rating in accessibility does not imply that a website is also rated high in usability, using the exiting usability evaluation tools. It is important to note that usability includes a combination of criteria such as aesthetics, ease of use, learnability and memorability etc. A low rating in these areas would still result in poor web usability no matter how accessible the website is. Currently, there is a lot of research on specific guidelines for usability and accessibility, but interestingly, these guidelines are often exclusive of one or the other. It would be beneficial for both the usability practitioners, researchers and website designers to have a genuine set of guidelines that address both usability and accessibility issues. This would enable the design of truly usable and accessible websites that eventually achieve the 'design for all' goal.

6. References

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