Spring 4-11-2011

Developing Credibility Guidelines for e-Government Website Design: An Empirical Study

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DEVELOPING CREDIBILITY GUIDELINES FOR E-GOVERNMENT WEBSITE DESIGN: AN EMPIRICAL STUDY

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Abstract:

Information Communication Technologies (ICTs) have changed how private sector business is conducted online. ICTs have also been adopted in the public sector, principally in terms of e-government. Users' interaction with e-government can be influenced by a number of issues, notably e-government website credibility. Therefore, credibility is an important factor in e-government development, but one that has received little attention. This study has evaluated credibility of current e-government websites. The findings indicate a number of credibility problems, and suggest that current e-government websites need to improve their credibility. As such, this study has developed a set of credibility guidelines, which guide designers to develop credibility in e-government websites. The final goal is to develop more credible e-government that can generate greater users' participation.

Key words: E-government development, E-government website, Credibility

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1. Introduction

Unlike traditional government, electronic government (e-government) provides government information and services online, so that users can conduct their services using its website, rather than visiting a physical place. In this context, a website can be seen as a 'window' for users to communicate with government organisations. However, users' interaction with e-government is largely determined by the first impression of the 'window'. Such first impression can be reflected by whether the e-government website demonstrates credibility (Huang et al., 2009).

As indicated by Robins and Holmes (2008), a website can be used and accepted by a wider range of users if users perceive the site is credible in the first place. Therefore, website credibility is emerging as a critical factor for developing successful e-government (Sidi and Junaini, 2006). However, designing credible e-government websites becomes a fairly challenging target since it is difficult for designers to identify what are users' requirements for credibility. In addition, no specific research investigates credibility of current e-government, specifically focusing on websites. Furthermore, there is a lack of empirical studies that support designers to develop more credible e-government websites.

In this vein, this study attempts to evaluate the credibility of current e-government, focusing on specific e-government websites in the UK, and identifying existing credibility strengths and problems. Based on the analysis of the findings from this study, a set of credibility guidelines are developed, which can guide designers to address credibility in relation to e-government website design. To implement this empirical study, a heuristic evaluation approach is used to assess credibility of current e-government websites which is based on users' perception of Fogg's set of credibility guidelines. As such, this paper starts with describing the background of e-government and credibility. It is followed by designing the empirical study, and presenting the evaluation results. Based on the findings, a set of credibility guidelines is then developed. Finally, a summary of the study is presented.

2. Relevant research

E-government is defined as the use of the Internet, especially web technology as a tool to deliver government information and services to users (Muir and Oppenheim, 2002). All e-government services within the national and local levels can be conducted via information presentation, interaction, transaction and integration (Layne and Lee, 2001). In the UK, governments at both national and local levels can be accessed through the Internet (Weerakkody and Choudrie, 2005), and make a variety of government information and services available online (Daniel and Ward, 2006). In addition, it provides users with two-way interaction with government throughout e-government websites (Senyucel, 2005). Therefore, the website is representative of an e-government and provides both sides of users and government agencies with a single point of contact for online access to government information and services (Thomas and Streib, 2003). In other words, the website can be seen as the interface of the e-government, which needs to be addressed during e-government development.

However, evidence from relevant studies indicates that users' adoption of e-government is influenced by website credibility. Credibility can be simply defined as trustworthiness and expertise (Hilligoss and Rieh, 2008). Regarding website credibility, it can be extended to multiple design factors, such as design look,

information design/structure, information focus, company motive, accuracy of information, reputation, etc. (Fogg et al., 2003). More credible website design leads to better users' interaction. For example, Welch and Hinnant (2003) found that the stronger users perceive that an e-government website provides reliable information, the greater belief in that government. Al-omari and Al-omari (2006) emphasized that the establishment of credibility of e-government can earn user confidence, especially in areas of personal and confidential services, which is helpful to build long-term trust. Furthermore, Carter and Bélanger (2005) showed that providing services in terms of ease of use, usefulness and trustworthiness impacts on users' acceptance of e-government. Table 1 summarises relevant studies that address the importance of different aspects of credibility to users' interaction with e-government. Accordingly, these studies suggest that credibility is an important factor in e-government website design, which should be addressed when developing e-government. Therefore, there is a need to evaluate the credibility of current e-government websites in order to develop more credible e-government that can increase users' engagement with it.

Topic	Study Authors/Year
Improving e-government's service in terms of trustworthiness	Bélanger and Carter, 2008; Tolbert and Mossberger, 2003; Warkentin et al., 2002
Information reliability	Welch and Hinnant, 2003
Interface friendliness	Baker, 2009; Garcia et al., 2005
Site ease of use	Kossak et al., 2001
System credibility	Huang et al., 2009

Table 1. Short summary of studies that investigate users' interaction with e-government

A variety of evaluation methods can be found from existing literature. For example, Liu and Huang (2005) apply a users' feedback survey method to assess the credibility of scholarly information on the web. Furthermore, Sidi and Junaini (2006) conducted a guideline-based survey, which is based on Fogg's credibility guidelines to examine the credibility of e-government website. However, Fogg and Tseng (1999) pointed out that credibility can be demonstrated from different aspects of the web. In order to better detect credibility, evaluation should focus on four types of credibility: presumed credibility, reputed credibility, surface credibility and experienced credibility. This is supported by Wathen and Burkell (2002), who implemented a staged evaluation of credibility, examining credibility from peripheral aspects to central elements. Such multiple steps assessment process is also reflected in Hilligoss

and Rieh (2008), who suggest that credibility assessment is seen as an iterative process. Therefore, this assessment method should involve construct, heuristics and interaction stages.

3. Methodology

For the evaluation in this study, an experimental study is considered as the most appropriate research method to investigate the credibility of e-governments. More specifically, it focuses on users' perception of credibility to measure the target e-government websites. Such measurement can be obtained within the controlled research conditions and environment. There are three research instruments in the experiment: the selected e-government websites, the task sheet and the credibility evaluation questionnaire. The e-government websites are selected as representative of e-governments and used to evaluate their credibility. The task sheet is used to deliver a set of practical tasks for participants to perform. The credibility evaluation questionnaire is used to identify users' assessments of credibility.

3.1 E-government website selection

To carry out the evaluation, the local level of e-government website is selected in this study. The reasons behind choosing the local level are that the local e-government website is the closest level to users and is the most frequently used contact point by the general public. Additionally, local e-government websites provide rich information and services, and significantly indicates the e-government effects on users (Tolbert and Mossberger, 2003). Furthermore, a number of design problems have been found in local e-government websites (Yang and Paul, 2005). Therefore, three local e-government websites in the UK have been selected in this study, named London Authority 1, London Authority 2 and London Authority 3 (LA1, LA2 and LA3).

3.2 Task sheet

The participants are required to perform a set of practical tasks on the target e-government websites. Such tasks are representative activities that users would be

expected to carry out when usually visiting an e-government website. The task sheet is used to deliver these tasks to the participants for the credibility and usability evaluation. Generally, there are three categories of e-government services (Garcia et al., 2005): information distribution, products and services offered and user participation. Information distribution is related to the provision of all types of government information. Products and services offered refer to delivering one-way services to users, such as documents downloads and job searching. User participation involves users interacting with two-way services on the site, for example, taxes payment and school applications. Based on these service categories, a set of task have been designed for the participants.

3.3 Credibility questionnaire

A paper-based questionnaire is used to identify participants' assessments of credibility of the target e-government websites. The design of this credibility questionnaire is based on Fogg's credibility guidelines (Fogg, 2002). There are three steps in the questionnaire design. Firstly, there is a need to extend the existing credibility guidelines in order to fit with the specific requirements of e-government. Secondly, a set of associated criteria for each guideline are developed, in order to focus on the detailed aspects of credibility. Finally, the specific questions are developed, based on these guideline criteria.

3.3.1 Extension of credibility guidelines

Fogg's credibility guidelines (see Tables 2) have been widely used for credibility inspection and their applicability and validation have been demonstrated in a number of studies (e.g. Hvannberg et al., 2007; Sidi and Junaini, 2006). In particular, these guidelines can effectively discover credibility issues in relation to website design (Fogg et al., 2003). As such, this study uses these guidelines as a starting point to evaluate the e-government websites credibility.

Credibility Guidelines	Explanations
G1. Site looks professional	The site should pay attention to layout, typography, images and consistency issues and visual design should match the site's purpose.
G2. Easy to verify the information accuracy	The site should link the evidence to show the validation and confidence in the materials and information presented.

G3. Show a real organization behind site	The site should prove that it is a legitimate organization, indicating there are real people working behind the site.
G4. Highlight the expertise in your organization and in the content and services provided	The site should indicate an expert team and provide authority services during user interaction.
G5. Show the honest and trustworthy people behind site	The site needs to show the real people behind the site, who convey their trustworthiness through images and text.
G6. Make it easy to contact you	The site should provide clear contact details, using multiple contact information at any time.
G7. Make site easy to use and useful	The site should support users to easily complete their tasks and allow them to conduct the tasks in their own way.
G8. Update site's content often	The site should update and review its content regularly.
G9. Use restraint with any promotional content	The site should avoid having ads, or clearly distinguish the sponsored information from the main content.
G10. Avoid errors of all types	The site should prevent a problem from occurring in the first place, even a small error, such as words misspelled and broken links.

Table 2. Fogg's credibility guidelines (Fogg, 2002)

3.3.2 Credibility criteria development

However, these guidelines were developed many years ago and in the context of general website credibility evaluation. In order to meet the specific needs of e-government websites, it is necessary to extend the existing Fogg's guidelines. Evidence from relevant studies on e-government studies indicate that e-government is used for public administration. E-government transparency is important in terms of government operation processes and the provision of in-depth government information, such as public expenditure (Welch and Hinnant, 2003). In addition, since a variety of information and services have become available on e-government websites, they need to deliver their services with flexible mechanisms that can support users developing their own ways to achieve the desired outcomes (Gant and Gant, 2002). Furthermore, all information and services are delivered and transacted via the Internet. Security and privacy are the key element in protecting such services in insecure areas (Bélanger and Carter, 2008). These concerns reflect the particular requirements of e-government websites and are closely related to user trust (Garcia et al., 2005). Therefore, based on these issues, three new guidelines for 'transparency', 'service agility' and 'privacy and security' are added to Fogg's ten credibility guidelines (see Table 3).

Extended Guidelines	Explanations
G11. Transparency	The site should keep users clearly informed about governmental operations and make government budgeting and spending information available.
G12. Service agility	The site should provide flexible services to fit different user paths.
G13. Privacy and security	The site should help users protect personal information and secure their private services.

Table 3. Extended credibility guidelines

3.3.3 Credibility questionnaire

Based on this development of associated criteria, a paper-based usability and credibility questionnaire is created for the purpose of capturing the participants' assessment of credibility of the target e-government websites. The participants are required to respond using a five-point Likert scale to indicate their agreement level for each statement.

3.4 Participants

To conduct the evaluation, 36 participants were assigned to evaluate three target e-government websites. Each target e-government website evaluation involved 12 participants. Each participant follows the same evaluation process, which consists of three phases: free-flow inspection, task-based interaction and completing the questionnaire. Free-flow inspection allows the participants to look through the target e-government website several times. They can freely either look at the overall e-government website or focus on the specific website design elements. Subsequently, the participants are required to complete a set of tasks on the target e-government website. Having accomplished all the tasks, the participants are finally asked to complete the credibility questionnaire.

3.5 Data analysis

The data is analysed using a one-way ANOVA and a one-sample T-test, supported by SPSS for windows (version 13). More specifically, to indicate whether there is a difference between the perception of overall credibility and the perception of specific credibility features in each target London Authority, a one-sample T-test is conducted.

4. Results

In general, the results indicate that credibility has been considered in the three target e-government websites since a number of credibility strengths have been found (see Table 4). For example, the target e-government websites provide the correct URL that properly presents the domain name of the local council. The content of the site matches with information users expect to obtain from a local council. The sites do not present too many irrelevant promotion contents. Furthermore, a postal address for each local council is clearly presented, which is helpful to build real-world presence on the sites.

LA1	Credibility strengths	Mean (Std. deviation)
	The URL properly presents the domain name of the local council.	4.33 (0.65)
	Significance	T=3.368, P=0.006
	The content of the site matches with information user expect to obtain from a local council.	4.25 (0.45)
	Significance	T=4.213, P=0.001
	Some personal services are protected with a password.	4.17 (0.72)
	Significance	T=2.252, P=0.046
LA2	Credibility strengths	Mean (Std. deviation)
	The content of the site matches with information user expect to obtain from a local council.	4.08 (0.515)
	Significance	T=4.328, P=0.001
	The site does not present too many irrelevant promotion contents.	4.00 (0.739)
	Significance	T=2.627, P=0.024
	The URL properly presents the domain name of the local council.	3.83 (0.577)
	Significance	T=2.360, P=0.038
LA3	Credibility strengths	Mean (Std. deviation)
	The site does not present too much irrelevant promotional content.	4.92 (0.289)
	Significance	T=12.320, P=0.000
	The URL properly presents the domain name of the local council.	4.83 (0.389)
	Significance	T=8.395, P=0.000
	The “Contact” option has been clearly indicated.	4.75 (0.452)
	Significance	T=6.587, P=0.000
	A postal address for the local council offices clearly presents on the site.	4.67 (0.492)
	Significance	T=5.464, P=0.000
	Information presented in a page matches the names of the categories.	4.58 (0.669)
	Significance	T=3.592, P=0.004

	Users can quickly start their tasks because site is easy to use.	4.58 (0.793)
	Significance	T=3.029, P=0.011
	Information presented on the site can encourage users to believe in the reliability of the local council.	4.50 (0.674)
	Significance	T=3.134, P=0.010

Table 4. Credibility strengths in LA1, LA2 and LA3

However, a number of credibility problems have been detected in each target e-government website and these problems are presented in Tables 5. Among these credibility problems detected, a lower mean score indicates a more serious problem. As shown in Table 5, in LA1, the credibility problem identified is that information is presented without consistent colours. Colour consistency is used to establish unity across pages of the e-government website, strengthening visual subject recognition and reducing layout clutter. It helps users to understand that information provided is organised and presented in the same way throughout the site. As such, after the initial experience with the site, consistent colours usage enables users to easily locate information to meet their needs. As indicated by Ozok and Salvendy (2001), consistent colours form an important part of overall web consistency, which may lead to better user performance and lower error rates. Conversely, failure of information presentation with consistent colours may affect visual continuity of the site, which may cause users difficulties in searching information through LA1.

Regarding LA2, the problem with highest seriousness is that search results are not organised by level of relevance. Search results need to be arranged in a logical order, which places the best hits at the top (Nielsen, 2000), so that users can quickly scan the results and easily identify their target. The level of relevance is commonly used as the logical sequence for search results arrangement. It can help users build sound understanding of the search results organisation. As indicated by Brinck et al. (2002), search results arrangement shown with the level of relevance enables users to easily locate items and reduces memory load problems. In contrast, failure to organize search results by level of relevance influences search engine capability, so that users may face the challenge of determining and choosing relevant items from a large number of search results.

In LA3, the problem with highest severity is that the detailed contact information is not organised by different departments of the council. Arranging contact information

by departments is used to represent an order of information organisation. It can provide users with a logical way to search contact information. As such, it increases users' understanding of information arrangements and reduces memory load problems. On the contrary, when detailed contact information is not arranged by different departments, users may feel it is difficult to locate target contact details to meet their needs as in LA3.

LA1	Credibility problems	Mean (Std. deviation)
	Information is presented without consistent colours.	2.58 (0.996)
	Significance	T=-3.883, P=0.003
LA2	Credibility problems	Mean (Std. deviation)
	Search results are not organised by the level of relevance.	2.43 (0.937)
	Significance	T=-2.242, P=0.047
	Information is presented without consistent colours.	2.67 (0.985)
	Significance	T=-2.720, P=0.020
	There is no clear security message when users access some confidential information.	2.92 (0.515)
	Significance	T=-3.521, P=0.005
LA3	Credibility problems	Mean (Std. deviation)
	Detailed contact information has not been organised by different departments of the council.	2.75 (0.866)
	Significance	T=-4.560, P=0.001
	It is not clear to see the site's credentials because the site does not display awards it has earned.	2.75 (0.754)
	Significance	T=-5.239, P=0.000
	The site does not provide a shortcut option for access to information about the local council.	3.08 (0.996)
	Significance	T=-2.805, P=0.017
	There is no clear secure message when users access some confidential information.	3.08 (0.515)
	Significance	T=-5.427, P=0.000
	It is not clear to indicate how much users have done and how much remains when completing tasks.	3.17 (0.937)
	Significance	T=-2.673, P=0.022
	The information about the site update is not clearly presented.	3.17 (1.030)
	Significance	T=-2.433, P=0.033
	It is difficult to see a sign-in option when users access some personal services.	3.17 (0.937)
	Significance	T=-2.673, P=0.022

Table 5. Credibility problems in LA1, LA2 and LA3

5. Credibility guideline development

Given that a number of credibility problems have been found in the target e-government websites, it suggests that designers do not pay enough attention to the credibility of current e-government websites, and lack the knowledge to develop

consistently credible e-government websites. Therefore, it is important to propose a set of credibility guidelines that support designers' understanding of credibility. In addition, it provides designers with concrete guidance when they approach credibility in the design of e-government websites. Table 6 presents the detailed credibility guidelines.

Credibility guideline	Design consideration	Interpretation
1. Site looks professional	To display content that matches with information users expect to obtain from a local council	To make quality content for users
	To employ colours to group related information	To distinguish information among subject options
	To use consistent colours in information presentation	To build unity through the site to support information identification
	To logically categorise information into subject groups and distinctly present	To support quick and accurate information identification
	To visually label every page where possible	To clearly distinguish page relationships
2. Easy to verify the information accuracy	To present information at the right level of detail on every page	To make information easily understandable for users
	To provide third part references	To support information source authority
	To arrange subject options in an alphabetical order	To allow users to easily scan and locate the relevant subject
	To provide the category name that matches with information presented in a page	To locate appropriate subject information
	To use common natural language words to present the URL	To make the URL easily understandable by users
3. Show a real organization behind site	To show multiple contact methods on every page	To meet users contact needs
	To describe the role of users and staff To present staffs' names and images	To show the real people working behind the site
	To make references to other governmental bodies by providing links and listing logos	To advertise e-governments credits and recognition
4. Highlight the expertise in your organization	To specify service policies information at a detailed level	To make service policies readily understandable To increase trust
	To provide precise, detailed and truthful information with source references and dates	To make reliable information for users
	To display complete and concise messages/prompts	To allow messages/prompts to be readily understood

5. Show honest and trustworthy people behind your site	To provide "About us" information	To make introduction information available for user
	To make references to other government agencies To display any awards earned by the organization	To form users' trust
	To provide detailed staff information with proper photographs	To enhance staff recognition
6. Make it easy to contact the e-government	To offer a quick contact option on every page	To make contact information easy to identify
	To provide multiple types of contact	To make contact information convenient for users
	To organise contact information by different departments	To make contact information easy to identify
7. Make site easy to use and useful	To provide multiple functions to support users' tasks completion	To make site easy to use
	To provide messages to indicate where users are within the site	To keep users informed of their service position
	To break down steps required to complete tasks To highlight current step completed in the process	To indicate to users how much remains to complete
	To arrange search results in the level of relevance To visually present the level of relevance	To make search results easy to remember and locate
8. Update site's content often	To indicate site update date To present information and services update date	To support users to judge information/services quality
9. Use restraint with any promotional content	To limit the number of promotional content	To maintain users' subject attention
	To present promotional content in non-important areas	To allow subject content easy to distinguish
10. Avoid errors of all types	To provide proper instructions for users	To reduce the likelihood of errors occurring
	To ensure that all links properly connect to corresponding pages	To support users' movement to find target information
	To use clear, simple language without typographical errors	To prevent misunderstanding for users
11. Transparency	To provide in-depth government information	To develop e-government transparency
	To provide a clear option linking terms and disclaimer information	To make data protection and copyright policy information available for users
	To send a clear confirmation message at the end of the process	To confirm that an online service has been finished
	To indicate task status using visual cues	To allow users to check their action progress
12. Service agility	To ensure that all functions of e-government work as a whole	To meet the different requirements of users

	To organise information in a hierarchical way	To identify relationships among categories
	To show the way out for users to exit the services at all times	To avoid users getting stuck on e-government services
13. Privacy and security	To provide a password allocation mechanism for users' authentication	To ensure that protected areas are secure
	To indicate a data protection message before transferring data	To make transaction processes understandable for users
	To present a warning message if users are allowed to access confidential services	To protect confidential information

Table 6. Credibility guidelines

In order to implement these credibility guidelines successfully, there are some aspects that need to be considered. Firstly, senior members of the organisation, such as senior managers or senior designers responsible for e-government, need to develop a sound plan, in which user-centred design is critical. In other words, users need to be involved in e-government development. Secondly, when the guidelines are used for designing a new e-government website, designers need to present and explain these guidelines to users at the detailed level and ask users to check whether these guidelines can meet their usability and credibility requirements. Designers should carefully consider users' comments and feedback and address the particular needs of the guidelines in the e-government website design. In this way, it can reflect the utility of these guidelines as flexible references. Thirdly, in the process of e-government website design, if the specific design elements conflict with each other, for example, the design element that information should be organised in a hierarchical way that matches with users' searching structure might contradict with users having their own strategies for searching for information. In other words, it is impossible to get a structure that matches with all users. In this way, designers should consider the circumstances under which the specific design feature should be followed. In addition, a balance must be found between obligatory design features and providing an adequate amount of flexible design features for designers. Furthermore, designers should use their previous experience or good examples to judge the specific design needs. Fourthly, when the guidelines are used for evaluating an existing e-government website, the evaluation results can generate two design options. One is to produce a new e-government website and another one is to redesign the e-government website based on the existing e-government website. The final decision mainly depends upon

the number of problems detected. When producing a new website, designers can develop an initial prototype to address all the problems found in the existing e-government website and carry out a heuristic evaluation and performance measure of the initial prototype. The results can be used to improve the initial prototype. If finance allows, this improvement can be conducted as an interactive process until a refined website design is achieved.

6. Conclusion

This study has evaluated credibility of current e-government websites in the UK. There are a number of credibility problems that have been identified in the target e-government websites. Such findings indicate that designers have not paid enough attention to address credibility in e-government website design and lack the knowledge to develop consistently credible e-government websites. Without considering credibility in e-government website design, users will not fully engage in e-government. As such, based on the analysis of findings from this empirical study, a set of credibility guidelines has been developed to guide designers in e-government website design. These guidelines can help effective e-government website design, by addressing credibility at the detailed level. In addition, these guidelines can be also used to support designers in evaluating credibility of existing e-government website according to whether the website design meets these guidelines. The final goal is to develop more credible e-governments that can make the better first impression of e-government website and generate greater users' engagement.

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