CHAPTER 3

Improving Usability

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CHAPTER PREVIEW

Government websites are becoming important channels and platforms for services delivery and citizen participation, but their effectiveness is limited by their usability. Research indicates that many government websites score poorly when evaluated for usability. The purpose of this chapter is to help readers better understand the current state of usability and how to improve it. The different aspects of usability presented include:

- How to define usability and its importance
- The development of usability and issues specific to it
- Suggestions for improving usability
- Best practices

WHAT IS USABILITY?

Simply put, usability describes how easy a website is to use; the easier it is to use, the higher its usability score. If visitors can only use a website with difficulty then the website has a lower usability score. But usability has also acquired more characteristics over time.

"Usability" is a term that has a specific sense in the world of human-computer interaction. Shackel (1991) proposed that usability describes the ease and efficiency with which computer users within a specific range, and with training and user support, used a computer's technical capabilities to complete a range of tasks in a specific context. Ease

and efficiency are emphasized in this definition, but scholars were not satisfied that this definition captured the full scope of usability.

For Nielsen (1994), there are five primary usability attributes. A system is more usable if it is easy to learn, efficient to use, easy to remember (memorable), has fewer errors—and errors should be easy to fix—and users are satisfied with the system. Nielsen changed Shackel's definition by suggesting learnability and satisfaction must be part of any evaluation of usability.

The "learnability" feature has become a key part of scholarly research in this area. For example, Pearrow's (2000) definition of usability emphasizes the greatest ease of use, ease of learnability, amount of usefulness, and least amount of discomfort. And the most widely accepted definition of usability is that proposed in the ISO (2001): usability is the capability of a software product to be understood, learned, operated, and attractive to its users.

In addition to the above definitions, usability means that a system can achieve its specified functions. Ease of use in this context refers to the efficiency, accessibility, and satisfaction of users in the process of using the system. Nearly all scholars agree that a system can achieve its specified functions when it creates a user experience that includes ease of use, efficiency, and user satisfaction. This broadens usability to include new perspectives when evaluating it.

For example, the International Organization for Standardization (ISO, 1998) interprets usability as the effectiveness, efficiency, and satisfaction with which specified users achieve specific goals in a given context. This explanation of usability adds effectiveness, which emphasizes a goal-oriented perspective. Effectiveness refers to how useful something is, while efficiency refers to how well something is done. Consequently, website usability has been a key element in website design and development since the beginning of the Internet age. In general, website usability means that users can easily, efficiently, and effectively achieve their purpose in visiting the website because its functionality is also learnable.

LIMITATIONS TO DEFINITIONS OF USABILITY

All of this remains true for government websites, but there are important differences. Despite the fact that many scholars have studied the usability of government websites, there is no generally accepted definition of usability in the government context.

That lack of consensus aside, usability research has become a well-established assessment technique and has been used in government research and development projects for decades. Early usability research was used to test military hardware, telecommunications, and information technology. In the beginning, the goal was to either make the product better or to make the accompanying instructions easier to use. Usability has expanded beyond that and now includes evaluating the user experience, ease of use, use of results in line with expected goals, and user satisfaction.

In the e-government context, most Internet users would agree that the usability of a web-

site will decide whether the visitor uses the site directly. This is an important consideration. Unlike the commercial Internet, there are virtually no alternative websites for government websites. For that reason, a government website should emphasize service equality, accessibility, interactivity, and customer satisfaction. And above all, the website must be easily usable.

Among scholars and practitioners, the usability of a website is a critical component in evaluating the development of e-government in a given agency or jurisdiction. Usability also plays a critical role in establishing website credibility, a key element in encouraging visitors to engage in online activity.

In this day and age, a person searching for answers about a city's services will very likely find and visit the city's government portal website. An e-government website, serving as a window for users, provides a first impression of a government and its online services (Huang & Benyoucef, 2014). So the quality of a government's web presence is critical for these first-time visitors, particularly in the case of local governments. Furthermore, the usability of the government website is one of the most important indicators when assessing government website performance. A government's website functions will be practically useless if the usability of the website is low and frustrated users choose not to use the website, and citizens increasingly expect to be able to find what they need on government websites.

Researchers have found that the availability of a government website can affect a citizen's trust in the government. If citizens are willing to learn more about the government's services, and perhaps even carry out some operations on the government website, this not only eased the pressure on the government, but also improved the quality of public services and public satisfaction.

DEFINING HIGH USABILITY

The Rutgers University Digital Governance in Municipalities Worldwide Survey (Holzer, Manoharan, & Ingrams, 2016), provides the latest usability measurements of government websites. The highest score was 18.13, and the average score was 12.38. But what do these usability measurements actually capture?

Looking at the 2016 survey indexes, usability was scored by evaluating the following: homepage length; targeted audience; navigation bar; site map; font color; forms; search tool; and the frequency of website updates (Holzer et al.,,2016). But these usability factors are not standard for all scholars. Others have put forward their own indexes and methods of measuring site usability. The following are some examples.

Shackel and Richardson (1991) posit that measuring usability means evaluating the friendliness of the system rather than evaluating the enthusiasm or fuzzy feelings of the user. They put forward four indexes to measure usability: effectiveness, learnability, flexibility, and attitude (see Table 3.1). Shackel also argued that the measurement of usability should be quantifiable and clear.

Table 3.1. Measurements of Usability (Shackel, 1991)

Index	Interpretation
Effectiveness	Experienced users in the completion of a task, the time required, the speed of the implementation, the user's mistakes, and so on
Learnability	The time and effort the user needs to achieve the effect of a task
Flexibility	As the user gradually becomes familiar with the system, the extent of adapting to the system's new interactive approach
Attitude	Users have a positive attitude and evaluation of the system

The ISO (1998) used its core factors to interpret the usability, including effectiveness, efficiency, and satisfaction. When evaluating the office work visual display terminals for human interface requirements, they pointed out three indexes to measure usability: effectiveness, efficiency, and satisfaction (see Table 3.2).

Table 3.2. Measurements of Usability (ISO, 1998)

Index	Interpretation
Effectiveness	Accuracy and completeness of the user to achieve a goal or subgoal
Efficiency	Ratio of the output to the input of the system
Satisfaction	This subjective scale identifies the user's comfort level in using the website

Nielsen (1994) proposed an assessment of a website's usability that he called usability engineering. Usability is not a single factor, so any evaluation of the website should assess the five primary usability attributes noted in Table 3.3.

Table 3.3. Measurements of Usability (Nielsen, 1994)

Index	Interpretation
Learnability	The system should be easy to learn to use, so that users can quickly start using the system. In a sense, learning is the most basic usability attribute.
Efficiency	The use of the system should be efficient, allowing users to quickly get the highest performance and have a higher level of productivity.
Memorability	The system should be easy to remember, so that noncasual users leave the system after a period of time and then return to the system and still find it easy to use, without having to learn from scratch.
Errors	The system should have a low error rate with no catastrophic errors, so that users will not make many mistakes, and even some mistakes can be identified and rectified easily.
Satisfaction	The system should be easy to use so that users will like to use it and are satisfied with it, subjectively.

Lin, Choong, and Salvendy (1997) set out to sum up Nielsen's previous work and put forward a more comprehensive usability index (Table 3.4).

Table 3.4. Measurements of Usability (Lin et al., 1997)

Index	Interpretation
Compatibility	The extent to which result of the operation is compatible with the user's target
Consistency	Consistency is twofold: internal consistency and external consistency. Internal consistency measured by the consistency of the wording and displays; External consistency measured by the consistency of the color coding and color meaning.
Learnability	The extent to which users feel site operation is easy to learn.
Least operation	The least operation that users needed to complete the task
The smallest memory load	The extent to which the user needs to memorize the content
Perceived limitations	The extent to which the user perceives the limitations of the site
User guide	The user feels that the Help function of the site is useful and easy to obtain.

Huang and Benyoucef (2014) refined Nielsen's factors by suggesting that e-government should also support users with different skill levels. To do this, users should be able to access services in a reasonably simple way and they should be treated with respect at all times. This meant expanding Nielsen's usability heuristics to add three more guidelines: interoperability, support and develop users' skills, and pleasurable and respectful interaction with users (Table 3.5).

Table 3.5. Measurements of Usability (Huang & Benyoucef, 2014)

Index	Interpretation
Visibility of system status	To keep users informed about their progress
Match between system and the real world	To use the user's language, follow real-world conventions, and make information appear in a natural and logical order
User control and freedom	To make "undo" and "redo" functions available during interaction
Consistency and standards	To keep the same design features and follow platform conventions throughout the website
Error prevention	To support users to overcome errors and prevent the same problem from reoccuring
Recognition rather than recall	To make information easy to remember
Flexibility, efficiency of use	To consider usage for both novice and experienced users
Aesthetic design	A minimalist design that is easy to navigate
Help user recover errors	To precisely indicate the problem and constructively suggest a solution
Help and documentation	To provide help to support a user's task completion
Interoperability	To make all service parts, design elements, and website functions work as a whole to support user task completion
Support users' skill	To support and develop users' current skills and knowledge
Respectful interaction	To present a pleasant design and treat users with respect

Kim, Kavanaugh, and Smithjackson (2007) identified website usability requirements associated with interface design using participant discussions and theme-based content analysis theory. Based on this work, they proposed five main categories to measure website usability: performance, user activity support, content, look and feel, and security (Table 3.6).

Table 3.6. Measurements of Usability (Kim et al., 2007)

Index	Interpretation
Performance	An interface allows accomplish task quickly. No error was expected in operation.
User activity support	An effective interface design supports users' needs by providing various functions.
Content	A good interface displays web contents in effective ways to enable users easy-to-understand/find desired information.
Look and feel	An interface allows users to develop familiarity while they visit the website over time.
Security	Users feel safe from leaking personal information.

Youngblood and Mackiewicz (2012) sought correlations between city population and city usability score, and correlations between city per capita income and city usability score. Based on their findings, they put forward their measurements of the usability of a government website (Table 3.7).

Table 3.7. Measurements of Usability (Youngblood and Mackiewicz, 2012)

Index	Interpretation
Web design errors	the use of a splash page the need for horizontal scrolling at 1024 by 768 resolution or below
Use of standard web design conventions	blue text links underlined text links text links that change color if the user has visited the linked page a link labeled "home" on internal (secondary) pages a city logo/name as a home link on internal pages
Presence of features Designed to make the site easier to use	a breadcrumb trail as part of the navigation a search box
Web presence	whether the site shows up in the first page of Google search results using key words

As can be seen by these different measurement descriptions, scholars are essentially trying to capture the elements of their definition of usability. Overall, efficiency, effectiveness, and satisfaction are still the core elements. But different scholars may consider other factors, such as learning. What's missing from these measurements is website security. As the development of e-government progresses, security is likely to become a much larger factor in evaluating usability.

A website with high usability will have the following four characteristics:

1. Users can use the site to complete their intended goal (effect).
2. Users can efficiently use the site to achieve its intended goal (efficiency).
3. Users can easily learn how to operate the website (learnable).
4. Users can be satisfied using the site (satisfaction).
5. Users can feel safe about personal information input onto the website (security).

THE IMPORTANCE OF GOVERNMENT WEBSITE USABILITY

Website Survival

On the web, good usability is a necessary requirement for the survival of any website that provide services. For example, if an e-commerce website is too difficult to use because it is too hard to read or does not satisfactorily answer customers' questions, then customers will not use the website. They have other options. So, for practical purposes, a website's usability decides whether it can attract and satisfy consumers' needs, and in theory, only with good usability can a website develop and evolve.

Petrie and Kheir (2007) suggested three typical categories of usability and presented them as problems. First, problems that only affect disabled people, or "pure accessibility" problems. Second, problems that only affect nondisabled people, or "pure usability" problems. And third, problems that affect disabled and nondisabled people, or "universal usability" problems.

Although governments are not in the business of selling goods or services on the Internet, usability is important for their websites, too. After all, government is the largest single producer, collector, consumer, and disseminator of information. With such a strong presence in the daily life of its citizens, a government as well as its agencies must develop their own websites through which they render a number of services.

Just like any other website, these sites operate in an environment that includes their own internal goals and those of their customers. Furthermore, a government website is the main Internet space for visitors to observe the city in a digital sense. Undoubtedly, a usable website creates a great first impression for citizens, visitors, and businesses, improves user trust in government, and allows users to efficiently get the information they need and complete their tasks online. When web visitors cannot find what they want or need on a government's website, they will resort to calling or visiting the office to conduct business. This ultimately raises the cost of government by making all transactions more expensive.

With e-governance becoming a more and more prevailing strategy to deliver services and information, government website numbers and the scale of information both increase. The development of electronic records management, information access, intellectual property,

information security, and information privacy has created numerous information statistics and archives that require collaborative processes (Thompson, Mcclure, & Jaeger, 2003).

It Impacts Users' Experience and Satisfaction

The ISO defines "usability" as "the effectiveness, efficiency, and satisfaction with which specified users can achieve specified goals in particular environments" (ISO, 1998). So, usability is a measurement of a website's friendliness and accessibility. In short, a website has good usability if it is easy for citizens to use and encourages them to participate by making it easy to connect. In this context, government realizes so-called deliberate democracy.

Put another way, a government should seek to improve its website's usability because it should strive to ensure that the government is legitimate and people-serving. The key factors here are user experience and satisfaction. When citizens search for information on a municipal website and easily find it, they have received assistance the first time they accessed the government website and accomplished their goals.

Ideally, governments are publicly accountable. Thus, their websites and those of their agencies need to justify citizen investment. If these sites do not meet the visitors' needs, then the number of complaints from unsatisfied citizens will proportionally increase with various troubles. Because governments must adopt citizen-centric approaches, such poor service has larger repercussions. This is why the usability of government and agency websites plays such a pivotal role.

Flavián, Guinalíu, and Gurrea (2006) studied the influence that perceived usability has on users' loyalty to the websites that they visit. The study's empirical analysis confirmed that user trust increased when the user perceived that the system was usable; most important, there was also a consequent increase in the user's degree of website loyalty. In the same way, greater usability was found to have a positive influence on user satisfaction, which also generated greater website loyalty. Finally, user trust was partially dependent on the degree of consumer website satisfaction.

In short, a government website with high usability increases citizen trust. As e-government develops further, and more and more citizens interact with government online, usability will become a more important factor in building citizen trust in government.

It Influences Government Behaviors

Efficiency, effectiveness, and economics are the three features cherished by the New Public Management Movement, viewing citizens as "customers" and emphasizing more on service efficiency and quality. Meeting these three goals can help decrease administrative fees. E-governance, of which government websites are a part, informs the public with service information, provides a new platform to promote government policies, and

collects and analyzes public attitudes. Using the Internet and other digital techniques, government information can travel faster and spread wider than with traditional methods. Governments can thereby save resources and get better results.

The added benefit in creating these digital information dissemination systems is that they can then be used to facilitate transactions, both internally and externally. Traditional transaction fees can then be lowered thereby allowing for the social control and management sought by the new public management movement. Inside government, the productivity and efficiency of internal operations will increase, while outside government, the public will receive information in a more efficient manner.

Given the factors defining usability, it therefore makes sense for a government website to adopt a usercentric design. First, high usability produces information that is easily understood and acted on, helping to enhance a government's legitimacy. Second, with limited government budgets, a website that meets user needs can help reduce transaction costs and increase efficiency. Third, traditional definitions of "public service" have the concept of usability at their core and it remains a substantial goal for government. Finally, with the development of the Internet and data networks, websites with high usability can be accessible anywhere and on any device.

THE DEVELOPMENT OF USABILITY IN GOVERNMENT WEBSITES

To evaluate the development of government websites, the E-Governance Institute at Rutgers University–Newark completed a series of research surveys starting in 2003. The evaluation consisted of five components: (1) Privacy and Security; (2) Usability; (3) Content; (4) Services; and (5) Citizen and Social Engagement (Holzer et al., 2016).

Usability, simply stated, measures whether a government website is "user-friendly." In the survey, usability was measured by examining three types of websites features: traditional web pages, forms, and research tools. In evaluating the traditional web pages, researchers examined issues such as branding and structure (e.g., consistent color, font, graphics, and page length). In measuring whether or not these forms facilitated ease of use, the examination, in particular, focused on whether field labels aligned appropriately with each field, whether fields were accessible by keystroke (e.g., tabs), whether the cursor automatically placed itself in the first field, whether required fields were explicitly noted, and whether the tab order of fields was logical. The evaluation also looked for advanced search features like exact phrase searching, the ability to match any or all words, and Boolean search capabilities (e.g., the ability to use AND/OR/NOT operators), as well as a site's ability to sort search results by relevance or other criteria (Holzer et al., 2016).

According to the recent report published in 2016, the usability of most government websites has improved in recent years. Overall, the average score has strongly increased from 12.04 in the 2013–14 report to 12.38. As grouped by continent, cities in Oceania

scored the highest in usability with an average score of 15. Europe had the second highest average score with 13.27, while cities in North America had the lowest average score of 11.04 in this category. Cities in OECD countries had an average score of 13.63, while cities in nonmember countries scored only 11.74 in this category (Holzer et al., 2016).

The higher scores for OECD countries indicates that cities in economically advanced countries continued to place more emphasis on usability compared to cities in less developed countries. The gap between OECD member and nonmember countries remained largely the same as was found in the 2013–14 report; but both member and nonmember countries have increased their average usability score (Holzer et al., 2016).

The 2016 report also contains results of the evaluation of key aspects of government website usability by continent. For example, the report specifically evaluates each website's targeted audience links to determine whether it has audience links divided into more than three categories (e.g., general citizens, youth, the elderly, women, family, citizens in need of social welfare services, businesses, industry, small businesses, public employees, etc.). For Oceania, 100 percent of its cities' websites had targeted audience links. This was followed by 89 percent of cities in North America, 71 percent of cities in Europe, 67 percent of cities in South America, 67 percent of cities in Asia, and 67 percent of cities in Africa. Save for South America, all continents showed an increase in their score. Further, on average, 77 percent of all cities that have such links show a rise of 15 percent from 62 percent in 2013–14 (Holzer et al., 2016).

Another key factor is the posting of site maps that contain active links and are less than two screens in length. Asia and Africa had the highest scores with 67 percent, followed by 66 percent in Europe, 56 percent in North America, 50 percent in Oceania, and 44 percent in South America. Save for Africa, the increase in percentage of site maps was nonexistent or slight among the continents. Overall, 58 percent of cities had a site map that contained active links and were less than two screens in length, a drop of 3 percent from 61 percent in 2013–14 (Holzer et al., 2016).

In terms of online search tools, all cities in Oceania, Europe, South America, and Africa contained a search tool. Asian cities had a search tool available for 94 percent of the websites studied. All cities showed a rise in their percentages, with nearly all continents reaching 100 percent in terms of this feature (Holzer et al., 2016).

Results also indicate that Tokyo, Hong Kong, Yerevan, Helsinki, and Tallinn are the top-ranked cities in the category of usability in 2015–16. Taking Tokyo's municipal government website as an example, it ranked first, with a score of 18.13 out of a maximum score of 20, showing much improvement from its ranking of 41 and score of 12.82 in 2013–14 (Holzer et al. 2016). The home page and internal links were accessible with a fast response time. In terms of targeted audience links, the home page was divided into four parts, providing information and services for social welfare, administrative information, business, and tourism. The sitemap at the top of the home page not only decreased website length but also made it comfortable for visitors to find targeted content.

It also provided multiple font sizes and languages in consideration of different users. In addition, visitors could search specific information conveniently by the search tool in the home page.

Some usability techniques have already been applied to e-government, primarily on an ad hoc basis (Róiste, 2013) These range from the application of principles (Hernon & Cullen, 2006) to usability testing methods (van Velsen, van der Geest, ter Hedde, & Derks, 2009) and the usability criteria demanded by public service delivery (Wimmer & Holler, 2003). In addition, several researchers (e.g., Hackett, Parmanto, & Zeng, 2004; Hanson & Richards, 2013) have found that e-government sites perform better than many commercial sites; and, in general, e-government accessibility has improved, despite the growing complexity of the sites.

EXISTING PROBLEMS AND ISSUES

In terms of usability, government websites have made great progress in the past few years. But some deficiencies still exist and there are large gaps in quality between different government websites. According to a 2013 research study, almost all Israeli government websites have room for improvement in terms of overall usability (Dan, Yahel, & Nitzan, 2013). And failure to ensure usability hinders user participation.

For instance, Anthopoulos, Siozos, and Tsoukalas (2007) found that if users failed to access and properly execute services due to usability shortcomings, their dissatisfaction increased. Such dissatisfaction may cause users to avoid returning to an e-government website, and even avoid recommending it to others. Prior research also suggests that website usability impacts users' impressions of, as well as their satisfaction with, e-government. In order for the project of e-government to continue, it must correct these usability problems as they appear

Existing problems can be divided into three groups: accessibility, design and layout, and navigation systems.

Accessibility

Accessibility is the basis of usability. Accessibility shows the extent to which the site and its contents are available to a wide range of users. Two sets of criteria are used to evaluate this feature: access to the home page with internal links and access to site content. Many national governments, including those of the United Kingdom, Germany, and Denmark, have established e-government usability standards; however, the United States has not done so except in regard to accessibility (Donker-Kuijer, de Jong, & Lentz, 2010).

Olalere and Lazar (2011) found that 90 percent of U.S. federal agency websites failed to meet Section 508 requirements. Section 508 of the Rehabilitation Act of 1973, as

amended in 1998, requires that when federal agencies develop, procure, maintain, or use electronic and information technology, that the IT is fully accessible for people with impairments. Furthermore the "laws that require accessibility and regulations that explain what interface features must be present" have not resulted in increased compliance (Olalere & Lazar, 2011).

Access to a website's home page and internal links is a useful means of determining the accessibility of the site from outside via the main search engines and from other government agencies sites. The city of Manila's website scored last in accessibility in the 2016 survey for several reasons. Some of the website's links were abandoned but were still on the website's front page thereby affecting the normal use of the website. Other links on the home page, like "BTAX online," were inaccessible. In addition, the loading speed of the home page and internal links was very slow.

Website interconnection. Another factor when considering accessibility is the interconnection between the government and its departments' websites. Take the government websites of Tokyo. The interconnection between the city websites and subordinate department websites was clear and easy to understand. If these connections are poorly designed then visitors will become frustrated and confused. For instance, Lima's municipal website was so poorly interconnected that it was difficult to obtain information about the city's various administrative departments.

Website stability. When researchers used the Santiago website, it suddenly became unstable and resulted in a poor user experience. Another example was Port Louis. Its government website was not accessible all the time. Website instability can be caused by many factors such as the user's computer, the browser, and so on. But with advanced techniques, this problem can be resolved effectively.

Access to site content reveals how operational a site is after being initially found and whether all sections can be easily accessed by different types of users. The relevant characteristics here are compatibility with popular web browsers, supply of alternative operational modes for higher technologies, options for slow connection such as turning off graphics, elimination of printing problems, availability of downloadable nonstandard software, and provision of alternative formats for downloadable documents.

Language selection also falls within this category. If language options are limited, foreign or nonresident users will have difficulty accessing relevant information. As mentioned earlier, the Tokyo municipal government websites provided users with many language options; in comparison, Manila's only foreign language option was English.

Update frequency. Another factor affecting accessibility is the frequency with which the website is updated. A government website should display the latest administration news and convey currently actionable public service information. On Madrid's website, the latest news included such topics as education, construction, and transportation. Time-effectiveness is vital for information dissemination. If the correct message cannot be conveyed, society will become unstable as the information gap will be filled by rumors.

For example, on Ho Chi Minh City's website, some out-of-date news was still posted, which likely led local people to think the website was useless.

Response effectiveness. Does the website reflect the government's response to social concerns around education, environmental protection, demolition, transportation, rising prices, and so on? This factor examines whether relevant departments cooperate with others to clarify policy, rationalize public sentiment and provide service. This is particularly important in emergency events. Does the website provide information coordinated by relevant departments after and during major emergencies or emergency events? A website with high response effectiveness will timely publish authoritative information as the emergency event develops and work to track the progress of government efforts.

Design and Layout

A good government website should have an explicit user interface. The design layout for a site's web pages should be consistent so that people find it enjoyable and comfortable to access the desired information and service without wasting time. A consistent color scheme and well-structured design elements make content easy to read.

Web page consistency. Web pages should also be consistent. For instance, the design layout and colors should be the same for all web pages on the site. Consistent design avoids user disorientation. Formatting content, such as putting page headings or important text in bold or different colors, enhances content readability. It also helps separate different kinds of information such as links and normal web page text. Page content sharing tools enable users to easily acquire or save web page content as a separate computer file. Examples of these tools include print, download/save, fax, and email options. West (2005) found that disjointed government websites could be greatly improved by using consistent layouts and navigation.

Design features. For many of the government websites studied in the 2016 report, design features played an important role. Tokyo's website was designed using pure colors, like white or blue. These kinds of design choices can make a huge difference in how users actually use the website and a good design can make citizens more willing to it. Poor design in this area was seen on Gaza's website. It used many strong and bright colors to decorate the page, which likely caused discomfort for users and probably decreased its number of user visits.

Web page interactivity. Proper design also takes into account the interaction between web pages. A government website should use tools to determine the actual needs of citizens who use the website. In this way, the interactive design of the web pages will enhance the user's experience. Hong Kong has one of the world's best websites and, takes pains to gather user information and user expectations with online questionnaires and surveys. This may also mean using such web features as a website administrator mailbox

and message board. In this way, the administrator can respond and optimize online service based on feedback.

Classification into categories. Proper design will also include proper classification. To that end, administrative information can be divided into two types. The first type is formal information—news of local leaders, departments, and administrative regulations, and the second type is informal information—local weather, traffic, and tourism information. Because informal information generally has more to do with the daily life of the average citizen, it should be more conspicuous than formal information. However, many governments put the formal news on the front page to avoid having to redesign the home page facade. This is unfortunate because the information that would benefit local people might be difficult to find.

Unique and descriptive headings, including links, should reflect the information and items contained within the category selected. Not only do category labels facilitate scanning on the web, but descriptive headings allow users to grasp the hierarchical structure of the information. In fact, headings used in proper HTML order improve accessibility for users with disabilities who need assistive technology such as screen readers. The category labels on Hong Kong's government home pages were brief, descriptive, and in HTML order. In contrast, the category labels used by Manila were unclear.

Navigation System

A good navigation structure and navigation tools help users find information easily and quickly on web pages. Navigation and consistency are among the most common usability problems for websites discussed in the usability literature (Rosenfeld & Morville, 1998). The following website features were examined in this category.

Website address (universal resource locator) clarity. Every online website has a unique, identifying address. The address should be the name of the institution and should be easy to memorize in relation to what the institution does.

Sitemap. A sitemap is a collection of links for all main web pages on a website. It helps users find specific information under a certain section of the website.

Search tool. This is a tool for searching information within a website without browsing through web pages. It is an important tool because it facilitates fast information retrieval.

Help/Frequently Asked Questions (FAQ) pages. These pages provide useful information to users when the users need help. FAQs are based on common queries raised by users.

Except for the website address of the Helsinki government (http://www.hel.fi/www/helsinki/en), which is difficult for users to remember, most addresses studied in the 2016 report were clear and explicit. As for sitemaps, many government websites did not have one and therefore needlessly increased the length of their home page and made it harder for users to find specific content. Most government websites had search tools on their

home pages but the search accuracy varied widely. The Tokyo site's search tools retrieved information quickly and accurately but Tunis's search tools performed terribly in that they displayed no findings at all. Another common navigation problem for many websites was the limited number of blog rolls based on interests and needs of visitors for easy access. Navigation between departments was also difficult because of the isolated nature of many of the departmental websites. This was especially clear in Manila's case. Lacking any navigation system at all, the city's website put all different kinds of information on the home page, which made the website very difficult to use.

Suggestions for Improvements

The government administrator tasked with a website improvement project should first formulate or revisit the long-term development strategy for usability for the website. A properly designed and maintained government website can improve administrative efficiency and promote the legal administration of government duties. Furthermore, if citizens can access public services online then the costs of government can be lowered.

Determine priorities. In developing website usability, the first place to start is determining the priorities of the governmental unit. A long-term plan takes into account the approach the government will take and helps the government document decisions made regarding the project's objective, scope, schedule, resources and deliverables. In addition to optimizing the usability of the website, governments need to provide adequate funding and other resources according to the strategy plan.

Recognize the needs of citizens. User research focuses on understanding user behaviors, needs, and motivations through observation techniques, task analysis, and other feedback methodologies. Some measures, such as card-sorting, contextual interviews, focus groups, usability testing, and surveys, can help determine what citizens need from the website.

Card-sorting allows users to group a government website's information. This helps ensure that the site structure matches the way users think. Contextual interviews allow government to observe users in their natural environment, providing a better understanding of the way users work. Moderated discussion with a group of users allows government to learn about user attitudes, ideas, and desires. Likewise, a series of questions asked of multiple users of a government website will help government learn about the people who visit the website. Usability testing identifies user frustrations and problems with a government website through one-on-one sessions where a "real-life" user performs tasks on the website.

Once the user information is collected, it can then be analyzed and priority can be given to the areas in urgent need of services. It may be necessary to provide specialized services for some important or special groups, or to provide personalized services according to different user roles. User operating habits are equally important and should be identified and respected. For example, government should be making progress on providing reasonable access for citizens using mobile services. Determining citizen preferences

can also be a matter of designing different types of websites and letting the public vote on their favorites. Using that feedback, it is possible to further optimize the design and layout of the website.

Study online resources. Numerous resources and materials are provided on several websites such as *Usability.gov* and *Webcontent.gov*, which can be downloaded and utilized by the users for free.

Usability.gov is the collaborative effort of many federal agencies. It is the primary government source for information on usability and user-centered design. The site publishes information on meetings and events, newsletters, and *Research-Based Web Design and Usability Guidelines*.

Webcontent.gov is a website managed by the Web Managers Advisory Council, an interagency group of about 40 web managers from every cabinet-level agency and many independent agencies and contains resources to make U.S. government websites citizen focused and visitor friendly. The Interagency Committee on Government Information (ICGI) was created by the E- Government Act of 2002 to implement section 207 of the act, which pertains to the accessibility, usability, and preservation of government information. This site includes links to the two reports to the Office of Management and Budget— *Recommended Policies and Guidelines for Federal Public Websites* and *Recommendations for the Effective Management of Government Information on the Internet and Other Electronic Records*—and one report to Congress, *Improving Access to the Internet*. Promoting communication and studying the experience of governments throughout the world can help any government improve its website techniques quickly.

Promote the application of new technology. To improve website accessibility and stability, a government must maintain its websites by using up-to-date Internet technologies. For example, the capacity of a government website's search tools is directly related to network information technologies.

When it comes to government website mobile services, two problems arise: the first is information transmission and the second is the information organization. For mobile government, information transmission is a function of mobile communication technology, but information organization is the process by which information is obtained, integrated, and expressed. With the continuous development of computer technology, network communication technology of all kinds will continue to emerge just as quickly. Citizens will come to expect to be able to use these new technologies on government websites.

For example, the popularity of mobile services continues to grow. By improving the quality of its mobile services, government allows new service types to become possible. The essence of e-government website mobile services is to improve the quality of service and administrative efficiency by means of the mobile communication technology that many citizens are already using or will use in the near future. Regardless of the new technology or platforms, however, government will still need to deliver services based on the usability principles described in this chapter.

Usability Best Practices

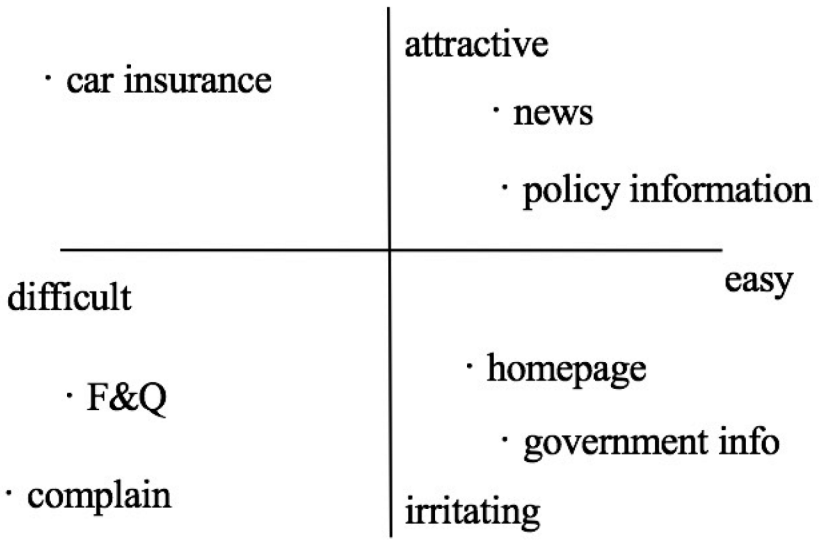
In measuring usability, quantitative assessment, as opposed to anecdotal, qualitative assessment, has been shown to have considerable value for process managers (Kirakowski & Cierlik, 1998.)

An assessment based on open-ended questions is hard to evaluate and aggregate; the same comments can have different meanings depending on the respondent. This makes it difficult to compare the results of observations and interviews. But standardized questions impose the designer's view on the respondent, which could shift focus to the wrong themes. Observations and open interviews deliver global conclusions like "The website is bad." But what does that actually mean? To correct what is "bad," should the entire website be changed, or only a small part? These methods do not exploit one of the most powerful capabilities humans have: to compare parts. The goal of any usability assessment should be to determine the relative measurement of things as opposed to an abstract, absolute rating.

In this, scholars saw a need for a method to fill the gap between general knowledge about usability (guidelines, standards, theories) and knowledge of users (human factor specification). To do that, user respondents must evaluate a website internally. A Venn diagram can help explain what is meant by this (Verlinden & Coenders, 2000).

This diagram was applied during the evaluation of a website of a local government based in the Netherlands. Directly after a traditional success time/failure rate test, the respondents were asked to compare a selection of web pages and to map those pages into a grid. This resulted in diagrams like the one shown in Figure 3.1.

Figure 3.1. Axes of Usability Measurement



In this paradigm, the difficulty visitors had finding information and the visitors' attitudes toward websites when using them were the two aspects used to measure usability. According to this example, users' attitudes depended on the efficiency and effectiveness of the website. In other words, a website was good when it was responsive, worked efficiently, and was easy to learn how to use. In short, it had good usability.

THREE EXAMPLES

When talking about the world's best e-government websites, the Asia-Pacific online communications powerhouse Future Gov singled out eight national e-government portals as the best-designed in the world and identified the best practices the sites exemplify. "Ultimately, these websites are the best in the world because they are designed to be practical, simple, quick and adaptable," writes Joshua Chambers, editor of *First Gov Digital*.

South Korea

According to the Digital Governance in Municipalities Worldwide (2015–16) survey, Seoul was again ranked number one. Across all dimensions, Seoul's government website ranked sixth for Privacy and Security, tenth for Usability, first for Content, first for Service Delivery, and first for Citizen and Social Engagement. Though the rank in Privacy and Security, as well as Usability, was lower than in previous evaluation results, on average Seoul maintained its reputation as a world class, best practice, high-quality, and comprehensive e-governance system. Although its usability ranks a little lower than other parts.

Seoul's government website had a user-friendly style, with a clear, block arrangement and an appropriate first page length. Users could easily find the elements, content, or tools they needed. The search tool on the first page also provided users an advanced channel to search for specific content. Another tool, "easy reads," linked to a simpler page style for people glancing at the most important things happening in the city. In sum, the website was designed to actually encourage a user to interact with the e-governance platform.

In addition to the high-level of usability, Seoul's government website featured crucial factors that affected its e-governance level. First, as it ranked first out of 100 cities in the world, Seoul's government website continued to act as a leading example of privacy protection and Internet security. For instance, users were notified in clear terms about privacy issues as they worked on the website. Second, the website provided high-quality content that citizens were concerned about, including news, policies, and government activities. Finally, the services delivered online were highly diverse, covering administrative applications to basic public services.

Most important, Seoul's government website featured user-friendly and multichannel citizen participation tools. Users could easily find access to several types of e-participation portals, including online petitions, debates, and citizen comment forums. In addition, on the first page, citizens could also directly send emails to the mayor. The website also indicated that citizens could use other social media to interact with the city government.

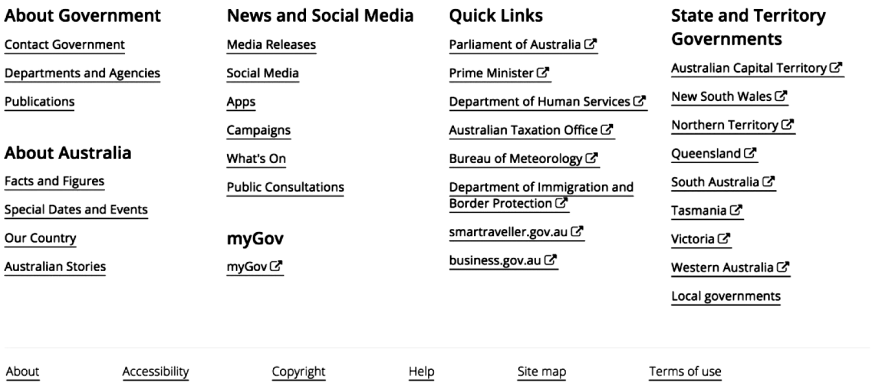
As shown in Figure 3.2, clear columns, sufficient but not overloaded information and simple navigation tools allowed users to feel comfortable.

Figure 3.2. The Home Page of Seoul's Government Website (Chinese Version)

Australia and New Zealand

Australia's use of comprehensive user research and testing has led it to make significant improvements to the Australia.gov.au portal that helped the country's e-government programs score second highest in the United Nations' 2014 e-government rankings. Besides the similar panels providing portals to all public services, the government focused on improving connections to other websites (Fig. 3.3).

Figure 3.3. The Bottom Bars of the Australia.gov Home Page



New Zealand's newly redesigned Govt.nz "doesn't look much like a government website at all," according to Future Gov. "It's very simple with a large font and no official insignia." Extensive user testing and feedback guided the designers' decisions.

These websites stand out by visualizing the often boring and complex terms, policies, and information that governments traditionally deal with. Icons and a flattened design made using the websites easier online or on the mobile apps. As citizen issues grew more and more complex, these e-government websites came to resemble search engines. However, category tabs were soon added when testing revealed that many users preferred simple tabs to help them find information. Prominent feedback options also encouraged citizen engagement. Also helpful were the addition of icons, cartoons, and videos that reflected the national culture. This allowed Australia and New Zealand to adopt their own visual and design language while meeting the highest usability standards.

Hong Kong

Hong Kong's Gov.HK was called vibrant, exciting, and "not at all like a staid government website" (Bowman, 2012). It is notable for its accessibility—it provides services in ten languages: Cantonese, Mandarin, English, Bahasa Indonesian, Nepalese, Tagalog, Pakistani, Thai, and Vietnamese.

According to *Digital Governance in Municipalities Worldwide (2015–16)*, Hong Kong's government website was ranked fourth in the world overall, and ranked second for Usability, third for Service Delivery, and tenth for Citizen and Social Engagement. Hong Kong intended for its citizens and other users to use its website as a "one-stop" service platform, which is reflected in its high level of usability and service delivery. Content was clearly categorized into different blocks on the main page, and key information such as budget reports and policy announcements were fully displayed. Even though the length of the first page was limited, it still contained a large amount of information.

In addition, multiple services could be accessed on the website, including business issues, administrative applications, citizenship applications, and others. The website also reflected the government's concerns about services for non-citizens—a large portion of Hong Kong's population—in a specific section on the main page. Also, smart phone applications that could access the website could be downloaded.

Summary

USA.gov was called "a great service for citizens," by Future Gov. The website synced up with social networks, offered email alerts, linked to YouTube videos, and had a comprehensive agency directory. It also continuously adapted its streamlined presentation and responsive design based on user analytics. Based on USA.gov's experiences, Web Systems Directorate and House Information Resources published *Suggested Web Site Best Practices 2011*, which was meant to provide guidance for government websites.

All of the successful websites had similar features. They had large, prominent search bars, a crucial part of any user's interaction with government websites. All sought out simplicity, limiting the number of links on the home page to only the most popular topics. All preferred grouping content by themes according to user interest, not just according to organizational structure. Icons, not images, allowed users to find information more easily. Content was made available in multiple languages. And, importantly, they implemented good responsive designs to make their websites more accessible for mobile devices.

For builders and designers, the world has plenty of examples of well-designed government portals. Analyzing their designs, innovative features, and the techniques used to develop them would be an essential primer for anyone considering the design of a government web portal.

CONCLUSION

The importance of e-government is increasing right along with the growing number of Internet users. Gradually, e-government will become more important to policy makers as citizen expectations of government keep pace with the interconnected nature of modern life. As it stands now, a government's website is one of the most important manifestations of its e-government development. As the functionality of a government website moves forward, so too does the development of e-government.

Moon (2002) points out the five stages of electronic government development, information dissemination/catalogue; two-way communication; service and financial transaction; vertical and horizontal integration; and political participation. Starting with the simple act of providing information, e-government can transition to two-way communication, then to the completion of transactions before finally allowing citizens

to participate politically. Moon's stages of development also reflect the development of government website functionality.

Usability is a key factor for a website's survival. It is not only concerned with users' experience and satisfaction, but also with its governance effect. In the end, a government administrator must pay attention to government website usability just like any other provision of government service.

KEY TERMS

Accessibility: The extent to which the site and its contents are available to a wide range of users.

Home page: The main page that a visitor sees when he or she navigate to a website through search engines.

Navigation system: The tools in the website to help users find information conveniently and efficiently.

Search tool: The tool for searching information within a website without browsing through web pages.

Site map: A collection of links for all main web pages on a website that helps users to find specific information under a certain section of the website.

Targeted audience: The intended audience or users of government information and services on the website.

DISCUSSION QUESTIONS

1. What does usability mean for a government website?
2. List the characteristics that you believe a government website with high usability should have.
3. List the usability problems of a government website you are familiar with.
4. What are your suggestions to improve government website usability?
5. What are the future trends of usability?

EXERCISES

Exercise 3.1.

Working as a group, design an index that can be used to evaluate the usability performance of a government website.

Exercise 3.2.

Choose a government website from any U.S. city and evaluate its usability performance using the E-Governance Evaluation Index from Rutgers University, available at https://spaa.newark.rutgers.edu/sites/default/files/files/EGov/Publications/US-Municipalities-2012.pdf.

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