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WEB PORTALS AND THEIR ROLE IN E-GOVERNMENT

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Abstract

This paper examines how state governments are using web portals to enhance electronic service delivery. We report the preliminary results of a study that investigate the steps that state governments are taking to create high functioning web portals by strategically designing the functions and features of their websites. We examine the functionality of all fifty state web portals by evaluating their features and the content across four dimensions: openness, customization, usability, and transparency. Reporting the results of a content analysis of the portals, we find that the nearly every state web portal is in the early stages of development. Most web portals have few high-functioning features and mostly serve to provide information and few online services, transaction capabilities, and openness. Nine states are moving beyond this and are making development decisions that enhance the portal's ability to service citizens with many high-functioning features. These states include California, North Carolina, Maine, North Dakota, Pennsylvania, New Mexico, Kansas, Texas and Virginia.

Introduction

This paper examines how state governments are using web portals to enhance electronic service delivery. Until recently, state governments developed their web presence on an agency-by-agency basis with little tendency to develop an integrated website that linked all state resources to a central location. While this strategy allowed them to create websites quickly, it limits the effectiveness of online government service delivery and makes it difficult to meet the needs of an increasingly web-savvy public. Under growing pressure to be more responsive to citizen needs, leading edge state governments are now beginning to rethink their web strategy and are reconfiguring their existing websites into web portals.

A web portal serves as the integrated gateway into a state government website and provides visitors with a single point of contact for online service delivery within the state. Because portals integrate state e-service, they can improve access to government, reduce service-processing costs, and enable state agencies to provide a higher quality of service. As a result, many states are beginning to transform their websites by replacing traditional homepages with web portals.

However, similar to the revelation of many private sector companies, state governments are now discovering that simply creating a site with various bits of information is not enough to truly serve constituents. At present, most state governments provide basic information on state agency policies and procedures through their web portals. Instead, state government officials are feeling pressure to build intelligent portals that give citizens the power to custom tailor a web page to fit their needs while also serving as the entryway to community news and events and as a catalyst for economic development. The challenge for policy makers and technology leaders is to figure out the best way to transform a basic website into a high-functioning web portal.

In this paper we investigate the steps that state governments are taking to create high-functioning web portals. We examine how state governments are adding value to their web portals by including relevant content and services, and by strategically designing the functions and features of their websites. We examine the functionality of all fifty state web portals by evaluating their features and the content across four dimensions: openness, customization, usability, and transparency. We report descriptive results for each of these dimensions. We find that the nearly every state web portal is in the early stages of development. Most web portals have few high-functioning features and mostly serve to provide information and few online services, transaction capabilities, and openness. Nine states are moving beyond this and are making development decisions that enhance the portal's ability to service citizens with many high-functioning features. These states include California, North Carolina, Maine, North Dakota, Pennsylvania, New Mexico, Kansas, Texas and Virginia.

Web Portal Development Lessons

There has been growing interest in understanding ways in which public sector organizations can use information technology, particularly applications delivered over the Internet, to improve service delivery and relationships with citizens. The search for more effective methods of delivering public services began in the early 1980s in most industrialized countries. In the United States, for example, the National Performance Review (NPR) recommended that government agencies "re-engineer government activities, making full use of computer systems and telecommunications to revolutionize how we deliver services" (NPR, 1993, p.v). The Access America Plan issued in 1997 strengthen this commitment to IT: "the NPR and Access America call for new IT-based information systems and improvements in the process by which they are managed to implement specific reforms in programs ranging from health care to law enforcement" (Heeks, ed., 2000, p.232). Heeks (2000) identified three main factors that have contributed to this phenomenon: (1) An unsustainable level of public expenditure that did not produce efficient public services (due to waste, delays, mismanagement, corruption or poor organizational and management skills); (2) a resurgence of neo-liberal thinking emphasizing the efficiency of market competition and the need to make government more business like; and (3) the rapid development of information technologies (IT) and the increasing awareness of the value of information systems (IS).

Although governments use a variety of information technologies to support these initiatives, the use of integrated websites or web portals is increasingly becoming an important component of e-government. E-government refers to efforts in the public sector to use information and communication technologies to deliver government services and information to the public. E-government offers numerous possibilities to use the Internet and web-based technologies to extend government services online, allow citizens to interact more directly with government, employ customer-centric services, and transform operational and bureaucratic procedures.

The adoption of the World Wide Web by governments is the focus of a growing number of studies. Demchak, Friis, and LaPorte (2000) suggest that the adoption of the web for delivering government services will catch-on rapidly as more web sites are built with greater openness and effectiveness. West (2000) reports that while government organizations are adopting the web as a tool of delivering government services, government at all levels is not making full and effective use of commonly available information technology. These studies look at the web in general. We build on these earlier studies by focusing on the web portal and its relationship to the rest of the web site for state governments and focus particularly on how web portals can be used to enhance government service delivery.

Web Portals

A web portal serves as the integrated gateway into state government and provides both external constituents and internal government personnel with a single point of contact for online access to state information and resources. State governments are very complex organizations with hundreds of agencies, departments, commissions, and regulatory bodies. Portals are web-based front-end applications that allow state governments to access and manage all of their data and information, and to deliver it to its users. Through this gateway or main user interface millions of web users can access the vast landscape of information, services, and applications available on the state web sites.

Since the mid-1990's when the first portals appeared widely on the Internet, their features and functions have evolved significantly. Many refer to the first wave of portals as "dressed up search engines." Commercial portal pioneers such as Yahoo!, Lycos, Excite, and AOL, organized on a single web page a directory of interesting web sites along with general interest information. These early portals matured quickly and increased their functionality by adding advanced search capabilities, enriched content, and increased user control. The latest portals do much more. Portals now have a robust collection of functions including: robotic crawlers that dynamically push categorized information on to the web page; tools that access integrated data from distinct enterprise applications and platforms; applications that customize website content; and other key features as e-mail, calendars, instant messaging, and chat areas.

Given the extraordinary potential for integrated, customized information delivery, portals are now being used by private sector firms, non-profit organizations, and governmental agencies. In fact, government-wide web portals are emerging as a key priority for government agencies as they develop their electronic government initiatives and create electronic relationships between government and citizens (G2C), government and business (G2B), government and its employees (G2E), and government and government (G2G). The portal is the center-piece of enterprise approaches to e-government. The challenge for government organizations is to determine which features are most appropriate for creating high-functioning e-government portals.

Web Portal Functionality

Hi-functioning government web portals are designed to search, classify, and present relevant information, and to integrate applications at three levels of complexity: information publishing and linking of existing web sites, single agency transactions, and transactions requiring integration of multiple agencies (IBM, 2001). Portals include tools to register, dynamically recognize, and classify users; giving agencies the ability to customize content, information access, and structure to meet the specific needs of an individual employee. Finally, because databases and legacy systems are often housed on different platforms, the World Wide Web is a convenient infrastructure to use as the foundation for the transfer of data, statistics, and records across organizational boundaries.

The promise of the web portal as an integrated access point to all relevant information is undeniable. As a coordinated entryway into systems and shared databases, a web portal can provide significant cost and time-savings. For example, a child welfare employee can, in less than one hour, check a juvenile's statewide history of school attendance, medical history, and interaction with the justice system prior to foster home placement. Without this integrated system, the employee may have spent days or even weeks trying to contact to appropriate parties and access the information (IBM, 2001).

In creating a high-function web portal, the goal of the portal is to use these features to promote openness, customization, usability, and transparency. Openness refers to the extent to which a government website provides comprehensive information and services, and maintains timely communication to all key public audiences (Demchak, Friis, and LaPorte, 2000). The more 'open' a website, the more facts, figures, services, and other pieces of information are viewable either through direct reprint on the portal or a link to a website containing the information. In some cases the portal contains links to internal state government agencies. In other cases, the links redirect the portal visitors to an external website such as a federal government agency or a non-governmental organization. The decision to reprint or link to data is often made based on portal space and design constraints, data availability, or the goals of the portal.

Customization refers to the ability to create user-specific content, layout and display. All web portals provide generic content tailored to meet the needs of the average portal visitor. However, high functioning web portals give users the ability to create customized views that provide personalized content organized in a way that meets the direct needs of the user. In fact, the power of the web portal lies, to a large extent, in its ability not only to consolidate information but also to provide that information in a specialized manner.

Usability refers to the ease with which users can access and navigate around the web portal. A well-designed portal delivers value to the user as a function of how accessible and usable the features on the site are. Well-designed portals have pleasant interfaces that are easy to use. It is also critical that the interface use these features in a common design across the portal and to the linked pages so that the underlying interface elements are relatively constant.

Another determinant of web portal usability is the extent to which the portal is accessible to all constituents of the state. Unlike private companies, which can develop their web portals to meet the needs of a carefully defined target audience, states must develop their web portals to provide equal access for all. Constituent groups include permanent residents, temporary residents (students, for example), business people, and tourists. Contained within each of these constituent groups, are members who may be visually or hearing impaired, members for whom English is a second language, and members with other special needs. Some constituents may want to access the web portal with new wireless technologies such as PDAs while others may gain access through basic computers running early versions of web browsing software.

This wide range of development criteria is a challenge from both the technological and content perspectives. However, in order to effectively meet the needs of all of their constituents, it is vital that states develop their web portals in a manner that truly does provide equal access. We measure web portal accessibility using a content analysis of the state web portals and applying the Web Content Accessibility guidelines developed by the W3 Consortium.

Transparency indicates how easy it is for the users to know the legitimacy of the content, contact information, who is responsible for the site, procedures and policies for security and privacy protection and the currency of the portal's content.

Data Collection and Methods

Data collection occurred during the spring of 2001. We conducted a comprehensive content analysis of the fifty U.S. state web portals using a one-hundred and thirty-one item portal evaluation questionnaire. The items contained in the questionnaire were adapted from standard website evaluation questionnaires to incorporate both generic website evaluation criteria as well as specific

questions relating to public sector websites. Using the aforementioned tool, we assessed the level of web portal functionality based on four dimensions: openness, customization, usability, and transparency. Each dimension represents a key aspect of portal functionality. High functioning web portals are those portals that contain features in each of the dimensions. The more features included on the web portal the higher the level of functionality of the portal.

Measures

To measure each of the dimensions listed above, we collapsed the questionnaire items into the four dimensions of openness, customizability, usability, and transparency. We summarize these measures below. The full list of questionnaire items and the assignment of items to the four dimensions is provided in the full project report (see Gant and Gant 2001).

Openness. To measure the openness of each of the state web portals, we examined the availability of state information and services through the web portal. We recorded the number and type of services available, the number of steps required to perform these services, and the extent to which personal data followed the user through their use of portal services.

Customization. We measure web portal customization based on the ability of web users to uniquely tailor views based on user registration data, to identify themselves with distinct user groups (for example, specific community members), and the extent to which the web portal dynamically recognizes these user groups and displays specialized content for them.

Usability. To measure the usability of the state web portals, we recorded features that increased the ease of use of the portal, making it easy to navigate and find necessary information. These features included intuitive menu systems, site maps, new information indicators, search tools, common state logo, uniform masthead, and dynamically generated list boxes. We also measured the level of accessibility of the portals by recording features such as help sections and FAQs.

In addition, we performed a Bobby analysis on each state web portal. Bobby is a web-based analysis tool developed by the Center for Applied Special Technology (CAST), which identifies existing or potential problems with the structure and content of the website for a person with special needs. For example, a visually impaired user may need to have an audio soundtrack added to a video demonstration.

To become Bobby approved and earn the right to display a Bobby logo, the website must meet the criteria outlined in the World Wide Web Consortium's (W3C) Web accessibility Initiative (WAI) Web Content Accessibility Guidelines. Included in these criteria are text equivalents for all images and multimedia items, black-and-white alternatives for colors, data table headers to facilitate line-by-line reading, chart and graph summaries of all, logical organization of content, alternative content for advanced technological features, and browser compatibility.

Transparency. To measure the web portal transparency we examined the portal for content and features designed to confirm the legitimacy of the portal and its interconnected web sites, services, and information. We identified whether the user could easily determine who is the authority responsible for the portal and its content along with the accuracy, objectivity, currency, and coverage of the content and information published on the portal. We examined the portal for features and content that indicated who or what agency is responsible for the portal and a way to contact via e-mail, telephone, or mailing address, them. We also examined the portal for features that indicated when the portal was created/published, dates of last update, name of person or agency responsible for content, a way to communicate with them, and person or agency responsible for technical support and a way to communicate with them.

Results

Below we discuss how the state web portals fare in each of the dimensions of functionality.

Openness

Openness is a key component of web portals as it underlies the idea of the portal as a one-stop shop for state government e-service. States design their web portals to serve as a main gateway to government information and services. As such, we found that all fifty state government web portals contain direct links and search engine access to the judicial, legislative, and executive branches of government as well as direct links to the major state agencies. However, the ease with which web users are able to use these links varies considerably by state.

Nearly three-quarters of the states use a drop down box to list hypertext links to all three branches of state government and each agency with a web site. This is perhaps the quickest way to link the user to an agency or department because it takes only one click to jump from the portal to the desired agency. For government IT departments, this design facilitates list modifications – easing the addition or removal of agency web sites as necessary. For the remaining one-quarter of the states, web portal users are two or more clicks away from direct access to each branch of state government and agency.

In addition to publishing information and linking to the three branches of government, web portals also enable users to perform transactions. Seventy-two percent of the portals have links to sites that allow the web visitor to complete state agency transactions with a single agency. Transactions most often supported through the web portal include tax filing, vehicle registration, and professional licensing.

Tax filing. For a growing proportion of citizens, filing state taxes, obtaining tax information and accessing tax forms online is a desired service. Nearly eighty-four percent of the state portals contain links to state tax websites through which users may download tax forms and tax instruction brochures. Seventy-six percent of the states offer online tax advice. Across all states, it takes an average of two mouse clicks to go from the web portal to the state tax web site in order to begin a session where the user can ask for information, obtain forms, and file taxes online.

Filing taxes online through the web portal is also a popular function. In fact, seventy percent of the state web portals have links that allow users to file taxes online. Paying taxes online is a bit more limited. Only fifty-eight percent of the states allow tax filers to complete the entire transaction online when expecting a refund. This number declines to forty-six percent when the tax filer owes tax money to the state. A small number of states require using specialized tax software, such as TurboTax, to complete the online filing.

Vehicle registration. Nearly all of the state web portals have links that will carry the visitor to general information about vehicle registration laws and information. However, only twenty-seven of the portals actually allow car owners to register a vehicle online. If the user wishes to renew their car registration, they have limited options for completing the entire transaction. Eleven states require the user to download the registration forms and mail it in. And web visitors in only sixteen states can complete the entire registration process. Web visitors find that it is relatively convenient to register a vehicle online. Across all states, it takes an average of 1.4 clicks to start the vehicle registration process from the web portal.

Professional licensing. Obtaining professional licenses is almost as common to do online as registering a vehicle. Twenty-five of the states allow web visitors to start the process for obtaining a professional license online however, the range of professional occupations varied considerably by state. Online license applications for cosmetologists, health professionals, engineers and architects are the most common – available from all fifty states portals. Most states make it easy to download application forms, and to access information and instructions for their completion. Only Maine and California allow applicants to complete the entire registration process online for at least two or more occupations.

Customization

All web portals provide generic content tailored to meet the needs of the average portal visitor. However, high functioning web portals give users the ability to create customized views that provide personalized content organized in a way that meets the direct needs of the user. In fact, the power of the web portal lies, to a large extent, in its ability not only to consolidate information but also to provide that information in a specialized manner.

Surprisingly, only a small number of states give portal users the ability to personalize the design and content. North Carolina, Pennsylvania, and California allow portal visitors to create personal profiles, to customize portal features and content based on these profiles, and to identify themselves with multiple constituent groups. Virginia's e-government portal also gets high marks for personalization and customization because its site allows users to create a personal profile and customize the portal content based on that profile. South Carolina and North Dakota also have limited personalization and customization capabilities on their portals.

Usability

Portals deliver value to the user as a function of how accessible and usable the features on the site are. Important usability issues include features that make it easy to navigate and find necessary information such as an intuitive menu system, site map, new information indicators, search tools, common state logo, uniform masthead, and dynamically generated list boxes. The ten most usable web portals include nearly all of these features. The states are Arizona, California, Colorado, Connecticut, Florida, Indiana, Louisiana, Maine, North Carolina, and Pennsylvania.

Well-designed portals also ensure access to the portal for users of different skill levels and abilities. User help, online training, and assistance focused on new users are essential features that make using a portal and the rest of the e-government site easier. Users visiting the Alabama and South Carolina web portals are offered the most help and training. Other state portals that lend a helpful hand to users by offering good online help and new user training include: Iowa, Kansas, Kentucky, Michigan, Nebraska, North Dakota, Texas, and Wisconsin. States such as Florida, New York, North Carolina, and Indiana offer limited help features. Surprisingly, 16 state web portals do not offer any form of help.

A small number of state portals use multiple languages to communicate with the users. In fact, only four states, Iowa, North Carolina, Texas, and Virginia, give users the option to view content in languages other than English or provides online language translation.

In addition to examining the user friendliness and language accessibility of the web portals, we also examined the extent to which the web portals are accessible to users with disabilities using the Bobby criteria. We found that thirty-four of the state web portals adequately serve users with disabilities. Many of these portals have minor problems relating to the use of graphic images. In several places they failed to include alternative text that explains the images to visually impaired users. Worse, however, sixteen states have portals with features that do not provide reasonable access to a significant number of disabled users. They failed to include alternative image text, often do not have table headers to facilitate reading, and have problems with content structure. States with the most egregious errors include Alabama and Louisiana. Table 1 list the states that failed the Bobby test and the number of major errors found on these portals. It is also important to note that not even the thirty-four states that pass the Bobby test are error free.

Table 1. State Web Portals That Failed Test of Accessibility Criteria for Disabled Users

State	Number of Bobby Errors
AL	48
LA	43
KY	27
MT	26
WV	21
OH	20
AR	18
NV	17
OK	15
NJ	14
MI	10
RI	5
NY	3
TN	2
SC	1
IA	1

We examined each web portal for features that allow users to interconnect with peripherals such as PDAs, other wireless applications, interactive voice response, and call center support. These technologies extend access to the portal beyond a computer and open up new opportunities to interact with state government. To date, Virginia is the only state that allows users to download information from the state web portal to a PDA. North Carolina's web portal supports interactive voice response and call center support.

Transparency

A well-designed e-government portal should employ various transparency and accountability features to enhance the level of public trust and legitimacy online as every state government successfully does in its offline environment. As with buying groceries, paying bills, or even registering a car in a department of motor vehicles office location, each person completing a transaction online should be able to obtain a receipt or other certification. We were surprised to find that only eight states allow

users to generate receipts when completing transactions. The states include Arizona, California, Delaware, Maine, New Mexico, North Carolina, North Dakota, and South Carolina.

We evaluated the objectivity of the web portal based on whether the portal was free of advertising. In looking across all of these criteria together, Kentucky and Kansas have web portals that go the furthest in making users feel at ease about the legitimacy of the portal and its content. Kentucky's and Kansas' portal include features for all of the criteria and the portals for Ohio, North Dakota, and Rhode Island are also strong in meeting these criteria. Interestingly, there are twelve states that do not provide any features to meet these criteria.

We also examined the steps that states are employing to establish trust and accountability through the web portal. We evaluated this based on the security and privacy features of the portal, measures to enhance transparency, and content design to confirm the legitimacy of the portal and its content.

We examined the security and privacy features of the web portal of each state. Following the trend on high-quality e-commerce web sites, we expected the state portal to have a statement of its security policy or post an independent security certification, particularly if the web portal launches you into applications that take personal information. We found that only ten of the state web portals post a security statement. We expected every state that allows users to set-up a user name and password to register or personalize the portal would also include a security statement. After all, the user is providing sensitive information. We found that thirteen states use passwords on their portals. Only five of these thirteen use passwords and include a security statement. So users in California, Kansas, Kentucky, Maine, and Maryland can read and understand the state's security policy. And we also expected portals to include an additional privacy statement. We found that thirty-two of the states include a privacy statement on their web portal. We were surprised to find that only eight states provide both a security and a privacy statement Consequently, the states with portals that are doing the most to communicate its security and privacy policies include: California, Hawaii, Kansas, Kentucky, Maryland, Maine, New Mexico, and Utah.

Discussion

While most state e-government web portals publish information, link to existing web sites, and enable users to perform single-agency transactions, some states are providing access to web-based transactions requiring the integration of multiple agency data. Among these states, one growing trend is to organize services offered through the web portal around events. For example, a citizen moves their residence and needs to update this information with all state agencies that require a current address. Without the integrated web portal, the citizen must identify relevant agencies and departments to contact, complete and submit change of address forms for each. On the other hand, the integrated web portal allows citizens to reduce this cumbersome process to a single step. Because all agencies are linked to a centralized database accessed through the portal, this transaction (change of address) is simultaneously updated in each agency. Currently, fifty-six percent of the state web portals organize e-government services around events. This is an emerging area of e-government application development and we expect to see more sophisticated examples of multiple agency integration soon.

This paper describes how the fifty US state portals incorporate the major dimensions of functionality – openness, customization, usability, and transparency – in their design. We make no claims about the level of service provided through these portals except to say that, in theory, higher functionality should lead to better service. Part two of this study will test this assertion.

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