Designing for a Digital City:
Advancing the Online Presence for a Municipal Government

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ABSTRACT

Since the City of Burnaby's (British Columbia, Canada) implementation of SAP in 2007, citizens, businesses, and employees have seen improved access to data and information, standardized business processes, and integrated workflow to assist with city operations. More recently, the city has been advancing their Virtual City Hall, a single point of entry to city information and online services. Find out how the city is adopting a user-centered approach in designing interfaces for their online content and business applications.

AUDIENCE

This is a technical talk targeted at all that work or study in the municipal, state, or federal government space. Students will take away sound study methods while industry professionals will walk away with key guidelines in designing for a digital government.

INTRODUCTION

Many government agencies' websites are dated and information-heavy. Often times, these sites provide citizens with an overwhelming amount of information on thousands of web pages. This requires users to exert much effort on information-seeking tasks such as retrieving information about paying taxes and fees in person, or searching for forms that they must download, fill out manually, and submit in person for processing at city hall (Sharit et al., 2011). As the demand for online services increase, cities are struggling to keep pace with the changing technologies (Bertot et al., 2008, Dwivedi et al., 2012). The constraints of public sector budgets and internal resource skills are hindering the deployment of online services to citizens. Such services include payment of property taxes, permit applications, and license renewals.

Citizens also have the ability to engage with the city by reporting real-time incidents, such as road potholes, or graffiti (Ganoe et al., 2010, Kim & Kleinschmit, 2012), but do not always have the channels to do so with dated government sites. Government agencies are beginning to address such issues of offering online services with the deployment of centralized portals to serve as a gateway to multiple back-end applications that support such online

capabilities. Additionally, government agencies are recognizing the need to use social media tools, such as Facebook, Twitter, Foursquare, and Instagram to encourage citizens to engage and communicate with the city online.

e-Government Usability

Studying the usability of government websites has seen a recent incline globally as researchers seek to understand the underuse of government sites within their countries. Al-Khalifa (2010) studied 14 Saudi government websites using a heuristic evaluation based on ISO 9241-151:2008 (Ergonomics of human-system interaction – Part 151: Guidance on World Wide Web user interfaces) and Travis' 247 web usability guidelines. His findings concluded the necessity to conduct usability testing with real users to understand key usability problems with government sites (Al-Khalifa, 2010). Golubeva (2007) evaluated 11 Russian government websites on the basis of its public value concept, comprised of public services, public policy outcomes, and public trust. The study revealed that the portals needed to improve in its public value offering according to a number of indicators, including transparency and interactivity (Golubeva, 2007). Additionally, Golubeva notes that the portals suffered from poor accessibility, navigability, and layout, suggesting that portal attractiveness also contributed to the portal's usability.

In North America, Youngblood and Mackiewicz (2012) completed a usability analysis of home pages for 129 city government websites in Alabama, USA. Usability standards, such as providing a breadcrumb trail, linking the city logo to the homepage, or ensuring that no horizontal scrolling was required, were evaluated. The authors recommend usability benchmarks for developers of government sites to help maintain and increase citizen access, satisfaction, and trust (Youngblood & Mackiewicz, 2012). While much prior work has identified the need for government portals to improve its usability, few studies have investigated the actual use of government portals by citizens. Our study extends previous work by offering findings that describe the usability of two award-winning North American government portals, based on actual user interactions and evaluation.

Study Method
To understand how and why citizens access municipal sites, we conducted a mixed-methods study, carried out with a sample population of 44 residents in the Greater Vancouver Regional District, located in British Columbia, Canada. Data was gathered through a two-staged study (System Usability Scale followed by a short debriefing interview) to allow participants to review desktop and mobile interface designs for two award-winning government portals (as determined by the Center for Digital Government's 'Best of the Web and Digital Government Achievement Awards'). We used the System Usability Scale (SUS) questionnaire (Brooke, 1996), which allowed participants to provide independent evaluations of each government portal for each interface (total of four).

Discussion
Generally, participants were concerned with the wealth of information contained with both government portals, on both desktop and mobile interfaces. Participants also expressed concern with the layout and structure of information, and indicated their frustration with the system's design and usability. In prior work, Sauro & Lewis noted the average SUS score was 68 for over 500 studies that employed the SUS (2012). None of the interfaces evaluated during our study met this average, with the highest score of 61 attained by the visual design on the desktop interface. A mean SUS score of 33 for the visual design on the mobile interface reflects major concerns with the system's usability.

As seen during our study, participants had very specific reasons for visiting their own city's portal, and would revisit information and services only applicable to them. For example, a dog owner will visit the city's portal to renew their dog's license on an annual basis, or a home owner will visit the city's portal to pay their property taxes on an annual basis. In line with Al-Hassan et al. (2009), such recurring transactions suggest the potential to design a modular portal in which citizens can create an account with security credentials, and then customize their experience based on their individual needs and interests.

To assist users with information-seeking tasks (Sharit et al., 2011), users can bookmark portal pages and store regularly filled forms and submit them through their personalized portal. To encourage engagement between citizens and governments, cities must find ways for their citizens to more actively use their portals. A personalized portal presents an online space catered to the citizen. This space can also serve as an opportunity to store a history of instances or messages when citizens have reported graffiti or potholes. Supported by Ganoe et al. (2010) and Kim and Kleinschmit (2012), such participatory channels can support active community improvements while encouraging use of online government services.

Responsive designs, where content is automatically resized to accommodate the screen resolution of any device, may not be optimal for the user experience, as seen when evaluating the City of LA's visual design on a mobile device. Instead, designers should consider developing a mobile app that is more text heavy, making efficient use of the smaller screen real estate. Additionally, there is a need to identify relevant content to be consumed on a mobile device, and further determining its value if consumed on a mobile device.

The findings from this study contribute design implications for government agencies to consider when designing an online portal.

OUTCOMES/CONCLUSION
First, we will introduce the audience to the City of Burnaby's award-winning 'Portal of the Year'. We will share best practices to consider in the portal's design, taxonomy, and information architecture. Second, we will explore the city's existing digital presence, including their website, SAP internal and external-facing portal, social media accounts, mobile interfaces, and interactive forms. Finally, we will present the findings from our study that evaluated two award-winning government portals, the City of LA, and the City of Austin and share our design implications.

PARTICIPATION STATEMENT
The primary investigator, Carolyn Pang, is committed to attending the conference if accepted. Her senior supervisor, Carman Neustaedter, may not be able to attend.

BIO
Carolyn Pang, 2013 Google Anita Borg Scholar, is a current PhD student interested in information management, human-computer interaction (HCI), and the design of domestic technologies that can mediate communication across geographically-separated families. Her track record includes numerous publications in the areas of human-computer interaction, domestic computing, mobile commerce, and technologies in developing countries.

She obtained her MSc in Interactive Arts and Technology, and a BTech in Computing, with a specialization in HCI. During this time, she explored the design of online interactive environments within an enterprise resource planning (ERP) system to assist government bodies in promoting civic engagement.

As a regular invited speaker to large-scale industry conferences such as SAP TechEd and ASUG SAPPHIRE NOW, Carolyn is also the City of Burnaby's Manager of Web Development. In this role, she is leading the creation of an enterprise web team that oversees the evolution of the city's digital presence and user experience. By leveraging best practices in web technology, development, and user experience, the new web team will lead the

maintenance and evolution of web and content systems to support the city's delivery of a citizen-centric web presence and online digital services.

Carman Neustaedter is an Assistant Professor in the School of Interactive Arts and Technology at Simon Fraser University in Vancouver, Canada. His research is in the areas of human-computer interaction, domestic computing, and interaction design; where he studies social culture, user behaviors, group collaboration, and ubiquitous and mobile technology design.

REFERENCES/BIBLIOGRAPGHY

1. Al-Hassan, M., Lu, H. and Lu, J. 2009. *A framework for delivering personalized e-Government services from a citizen-centric approach*. In Proceedings of the 11th International Conference on Information Integration and Web-based Applications & Services (iiWAS '09). ACM, New York, NY, USA, 436-440.

2. Al-Khalifa, H.S. 2010. *Heuristic evaluation of the usability of e-Government websites: A case from Saudi Arabia*. In Proceedings of the 4th International Conference on Theory and Practice of Electronic Governance (ICEGOV '10), Davies, J. and Janowski, T. (Eds.). ACM, New York, NY, USA, 238-242.

3. Bangor, A., Kortum, P. T., and Miller, J. T. (2008) An empirical evaluation of the System Usability Scale. International Journal of Human-Computer Interaction. 24:6, 574-594.

4. Bertot, J.C., Jaeger, P.T., and McClure, C. R. 2008. Citizen-centered e-government services: benefits, costs, and research needs. In Proceedings of the 2008 International Conference on Digital Government Research (dg.o '08). Digital Government Society of North America 137-142.

5. Brooke, J. (1996). SUS: A "quick and dirty" usability scale. In P. W. Jordan, B. Thomas, B. A. Weerdmeester, & I. L. McClelland (Eds.), Usability evaluation in industry (pp. 189–194). London: Taylor & Francis.

6. Church, K., Smyth, B., & Keane, M. T. (2006). Evaluating interfaces for intelligent mobile search. In Proceedings of the 2006 international cross-disciplinary workshop on Web accessibility (W4A): Building the mobile web: rediscovering accessibility? (pp. 69–78). New York, NY, USA: ACM.

7. Dwivedi, Y.K., Weerakkody, V., and Janssen, M. 2012. *Moving towards maturity: challenges to successful e-government implementation and diffusion*. SIGMIS Database 42, 4 (January 2012), 11-22.

8. Ganoe, C.H., Robinson, H.R., Horning, M.A., Xie, X., and Carroll, J.M. 2010. *Mobile awareness and participation in community-oriented activities*. In Proceedings of the 1st International Conference and Exhibition on Computing for Geospatial Research; Application (COM.Geo '10). ACM, New York, NY, USA, Article 10, 8 pages.

9. Golubeva, A. A. 2007. *Evaluation of regional government portals on the basis of public value concept: case study from Russian federation*. In Proceedings of the 1st international conference on Theory and practice of electronic governance (ICEGOV '07), Tomasz Janowski and Theresa A. Pardo (Eds.). ACM, New York, NY, USA, 394-397.

10. Kim, B.J. and Kleinschmit, S.W. 2012. *A logistic multilevel model for civic engagement and community group impact in the digital age*. In Proceedings of the 6th International Conference on Theory and Practice of Electronic Governance (ICEGOV '12), J. Ramon Gil-Garcia, Natalie Helbig, and Adegboyega Ojo (Eds.). ACM, New York, NY, USA, 34-37.

11. Sharit, J., Hernandez, M. A., Nair, S. N., Kuhn, T., & Czaja, S. J. (2011). Health Problem Solving by Older Persons Using a Complex Government Web Site: Analysis and Implications for Web Design. ACM Transactions on Accessible Computing, 3(3), 11:1–11:35.

12. Youngblood, N.E., & Mackiewicz, J., *A usability analysis of municipal government website home pages in Alabama*, Government Information Quarterly (2012).