

AN EXAMINATION OF THE MUNICIPAL 311 SYSTEM

Richard W. Schwester, Tony Carrizales and Marc Holzer*

ABSTRACT. Government accountability and responsiveness are foundational concerns of public managers, citizens, the media, and advocacy organizations. Technologies provide viable alternatives for increasing citizen access to government and improving government's responses to the issues of greatest concern to citizens, and the implementation of non-emergency 311 systems have shown tremendous potential in this regard. This paper, therefore, examines municipal 311 systems in terms of accountability and responsiveness functions, namely usability, services provided, internal operations, and measurable outputs. A survey of fourteen municipalities with 311 systems throughout the United States results in the identification of best practices in each of the four research categories.

INTRODUCTION

Government accountability and responsiveness are foundational concerns of public managers, citizens, the media, and advocacy organizations. Finding appropriate ways to monitor government performance, to provide mechanisms for citizen feedback and complaints and to document government responsiveness in terms of timeliness and service quality are basic threads in the development of the field of public administration. Technologies provide viable alternatives for increasing citizen access to government, improving

* *Richard W. Schwester, Ph.D., is an Assistant Professor of public administration at John Jay College of Criminal Justice. His research interests include the use of technology in governance. Tony Carrizales, Ph.D., is an Assistant Professor, School of Management, Marist College. His research interests include e-government and diversity in the public sector. Marc Holzer, Ph.D., is Dean and Board of Governors Professor, School of Public Affairs and Administration, Rutgers University – Newark, and the Executive Director of the National Center for Public Productivity and the E-Governance Institute. His research interests include public performance measurement and e-government.*

government's responsiveness to the issues of greatest concern to citizens, and holding government more accountable. The implementation of non-emergency 311 systems has shown tremendous potential in this regard. This paper, therefore, examines municipal 311 systems in terms of accountability and responsiveness functions, namely usability, services provided, internal operations, and measurable outputs.

BACKGROUND INFORMATION

Origins of the Municipal 311 System

The municipal 311 system was initially envisioned as a means of alleviating 911 congestion resulting from high numbers of non-emergency calls. Non-emergency calls to 911 delay the delivery of emergency services, causing backlogs and inefficiencies for law enforcement, fire departments, and emergency medical technicians. This leads to frustration and sometimes deadly consequences for callers with true emergencies. By 1996, an estimated 50 to 90 percent of 911 calls were deemed non-emergency calls (U.S. Department of Justice, 2006). At that time, President Clinton challenged the Department of Justice (DOJ) to relieve 911 systems of congestion. The White House and the Office of Community Oriented Policing Services (COPS) of the DOJ sought corrective action, requesting that the Federal Communications Commission (FCC) set aside 311 for use as a national help number for non-emergencies (Solomon & Uchida, 2003). In 1997, the FCC established the abbreviated telephone number 311 for non-emergency local government services (City of Oakland, 2002).

Baltimore was the first city to implement a 311 system, and it was specifically designed to siphon non-emergency calls away from 911 and create more opportunities for police officers to engage in community and problem-oriented policing activities (Mazerolle, Rogan, Frank, and Famega, 2003). Subsequent to 311's implementation, the Baltimore Police Department noted less strain on the city's 911 system; that is, the average amount of time for a 911 operator to answer an emergency call decreased by 50 percent, the number of 911 callers that hung up without ever speaking to a 911 operator decreased by 50 percent, the number of 911 callers receiving a recorded message (as opposed to speaking with a live operator) decreased from 18 percent to four and the amount of time between

incoming 911 calls doubled from 70 seconds to 143 (U.S. Department of Justice, 2006).

Frustrations with local government services, however, increased the demand for 311 systems that go beyond alleviating 911 congestion. Cities throughout the U.S. began exploring 311 as a means of consolidating its non-emergency service requests (Welsh, 2001). For example, in 1997 Dallas consolidated 28 customer service numbers and seven call centers into a single 311 non-emergency call center. This allowed citizens to call 311 for a host of city services, including Animal control (e.g. animal cruelty, unrestrained animal, noisy animal); Sanitation (e.g. missed garbage, illegal dumping); Streets (e.g. street and shoulder repair, storm drain cleaning); Public works and transportation (e.g. illegal parking, street lighting, traffic signals); Code compliance (e.g. junk auto, high weeds, property damage, litter, graffiti); Economic development (e.g. building permits); Parks (e.g. tree trimming, park maintenance); Environmental and health services (e.g. noise pollution, air pollution); Housing (e.g. human services, housing programs); and Water (e.g. main break, sewer leak, burst pipe). The Dallas non-emergency call system was designed to provide citizens with accurate information about city services, eliminate bureaucratic red-tape, and provide citizens with the services they needed in a timely and efficient manner.

Several cities began emulating the Dallas model. New York, for example, implemented 311 in 2003 to provide residents with quick and easy access to all government services and information. The 311 system provides a low-maintenance point of access for determining whom to contact when a resident has a question, complaint, or wants to request a service. Before 311, New York residents were forced to thumb through an eleven-page directory of city government phone numbers. Also, New York's system allows residents to track the progress of their requests, which serves as an accountability mechanism (Holzer, 2007). While developed as a response to overburdened 911 call centers, 311 has emerged as an innovative information and service delivery tool that promotes greater governmental responsiveness and accountability.

A Tool of Governmental Responsiveness and Accountability

Berman (1997) argues that the relationship between government and citizens is strained, the result of citizens feeling disconnected

from government, as well as the perception that government service delivery is inadequate. As a result, citizens have become increasingly cynical toward government. In the hopes of reversing this trend, technology has been viewed as a means of cultivating a governmental landscape where information is more accessible, people feel better connected to government, and services are provided with greater effectiveness and efficiency – thus enabling a more responsive and accountable government. The use of technology as it relates to government service delivery and information access is typically discussed in the context of e-government. According to Calista and Melitski (2007, p. 12) e-government “provides governmental services electronically, usually over the internet to customers, to reduce their physical character by recreating the virtually.” Cloete (2003) argues that effective government is a function of accepting technological innovations. Implementing Internet-based services and other technological service delivery applications may better enable governments to meet their service delivery goals. Some of the earliest developments included policy and regulatory information simply posted online. Soon thereafter, government forms were made available for download from city websites. Finally, some of the earliest dimensions of e-government included bi-directional communications of citizens requesting general municipal information via e-mail or electronic request forms.

West (2004), however, argues that e-government has failed to reach its potential from an information access and a service delivery standpoint. This may be attributable, in part, to the digital divide. Despite the potential benefits of e-government and Internet-based applications, there are segments of the population that are without web access and web-related skills (Norris, 2001). And even though the online population is increasingly reflective of communities in general, the digital divide means that many are excluded. Those segments of the population typically excluded are lower income individuals and senior citizens.

As an alternative to Internet-based e-government applications, 311 call centers provide new opportunities for enhanced service delivery and communication with citizens (Fleming & Barnhouse, 2006). The 311 systems can potentially improve the strained relationship between government and citizens insofar as these systems allow residents to make service requests and provide

feedback regarding the fulfillment of those requests (Barnhouse, 2008; Kavanagh, 2007). Government responsiveness may be enhanced simply because a resident can dial 311 and ask the department of public works to fill a pothole on his or her street. Accountability may be enhanced because if that pothole is not filled properly or in a timely manner, that resident can dial 311 to lodge a complaint. Through 311, government is merely a phone call away (Fulla, 2007). In addition to fielding information and service requests and being able to track whether those requests are fulfilled, 311 can be used to measure government performance. Chattanooga's 311 regularly makes available performance data collected via 311, which serves to enhance accountability (Eichenthal, 2005). Baltimore's 311 system serves as an information feed to its CitiStat program – a performance-based management system that uses computer pin mapping technology to chart agencies' performance on a bi-weekly basis. Performance data collected via 311 may help governments to determine where increased resources should be allocated or predict potential service delivery problems. As such, Kiviat (2005, p. 1) argues that "311 callers are helping to build more intelligent, more responsive cities."

METHODS

The following data represent survey responses from municipalities having implemented 311 non-emergency systems. At the time of this survey, 32 municipal 311 systems were identified, of which data were obtained from 14: Chattanooga (TN), Hampton (VA), Louisville (KY), Austin (TX), Orlando (FL), Somerville (MA), Rochester (NY), Riverside (CA), San Jose (CA), Akron (OH), Minneapolis (MN), Houston (TX), San Antonio (TX), and Birmingham (AL). This research evaluates municipal 311 systems based on four specific categories: usability, services, operations, and system measures. These categories measure responsiveness and accountability functions of 311 systems. Table 1 provides a summary description and shows how each 311 category is scored. Appendix A provides additional information.

Usability

The first category, Usability, highlights the relationship between the caller and 311 system's usability. This category has ten key

TABLE 1
311 System Evaluation Criteria:
Responsiveness and Accountability Functions

311 Category	Key Concepts	Raw Score	Weighted Score	Keywords
<i>Usability</i>	10	10	20	User-friendly, wait-time notification, multi-lingual, call-in hours, call routing, citizen tracking
<i>Services</i>	18	36	40	Health, social, and community services, housing, legal, transportation, permits, sanitation, utility, visitors and employment
<i>Operations</i>	13	10	20	Call routing, database, training, walk-in inquires, online, self-service web channel
<i>System Measures</i>	8	8	20	Busiest time of day, calls per agent, feedback system, security/privacy, population, average wait time
Total	49	64	100	

concepts with a scoring scale of “0” and “1” for each concept. When citizens call into a 311 system, the ease of use is a critical part of the experience and bears on sustained use by citizens. Transfers to other departments or within the 311 system may be a necessary aspect of the system, but excessive transfers can become a deterrent to future use of the system. In addition, a short wait-time and being able to speak to a live operator all represent a higher standard of usability performance within a 311 system. Some questions highlight coding into the scoring scale of “0” and “1”: What are the hours for call-in live operation? (The response to this question can vary from 8am to 5pm, five days a week, to 24/7 with live operators. For any 311 system that practiced 24/7 hours of live operation, a score of “1” was assigned.) Are callers notified of their expected wait time or position within the queue? (“Yes” was scored as a “1.”) “How many calls are unable to be addressed because of language barriers?” was assessed in terms of percentage of incoming calls. A response of less

than five percent was reported as a “1.” Finally, two questions were associated with tracking and whether citizens were able to track the service request via call-in service number, the web, or by an automated IVR.

Services

The second category, Services, represents the broad range of deliverables by the 311 system. In some cases call-in requests may be seeking information only, while in other cases call-in requests require processing so that a particular service can be addressed. The number of services offered varies with each municipality’s 311 systems, but some of the most prominent associated with public services are included in the scoring and surveying. A total of 18 service possibilities were included in the survey, with possible scores of “0,” “1,” and “2.” For service requests that are addressable by the 311 center, without transfer, the 311 system receives a score of “2.” Those addressable by the 311 system via transfer or by merely providing information received a score of “1.”

Operations

The third category, Operations, focuses on the internal operations of the 311 system. There are 10 key concepts associated with the category of Operations, each with a possible score of “1” for a total raw score of ten. The area of internal operations includes call routing and the ability to route based upon time of day or week. The ability to have walk-in and online service requests via call centers and websites also represent the operations of a 311 system. The ability of the 311 system to automatically determine service area based on Geographic Information Systems (GIS) and physical address information is included as well. Responses to the question, “What is the length of the initial training for 311 staff?” range from a few days to eight weeks of training. Those responses were coded so that 10 days or fewer resulted in a score of “0” and any period of training that went beyond 10 days was a score of “1.”

System Measures

The fourth category is System Measures. This category covers much of the data associated with measurable outputs by the 311 system. This does not include whether the system was utilizing

performance measurement based on the data collected by the 311 systems. Some questions associated with a performance score include the percentage of calls handled by an Interactive Voice Response (IVR) system. A level of ten percent or lower received a score of "1." The average number of calls received per agent in an eight-hour period is another system measure, with responses averaging 100 or more receiving a score of "1." Finally, the existence of a feedback mechanism for citizens, average wait time, and whether a 311 system has a security/privacy policy was taken into account as well.

RESULTS

Usability

Survey data regarding 311 system usability indicate that Somerville, Louisville, Orlando, Houston, San Antonio all have relatively high performance scores in this area. Somerville and Louisville each received usability scores of eight, while Orlando, Houston, and San Antonio received scores of seven (of a possible score of 10). In contrast, Akron and San Jose both received scores of three. All but one of the 14 municipalities (Austin) have 311 systems where calls are transferred to other individuals within the 311 call center, and if a caller is transferred, that person is connected to a live person rather than being placed in another queue. Only Birmingham tracks calls after a transfer takes place. Of the 14 municipal 311 systems, only Hampton, Somerville, Houston, and San Antonio notify callers regarding their position in the queue or their expected wait time. Not all 311 call centers operate 24/7, but for those that do there is an increase in accountability by government for its citizens. Governments that have chosen to incorporate 311 systems have created "added value" to their interactions with citizens by extending access and hours of operation (Eagle, 2004). Louisville, Somerville, Rochester, San Jose, and San Antonio provide 24/7 live 311 operation. Of the remaining nine municipalities that do not provide 24/7 live service, five provide an automated information system. Eight of the 14 municipal systems provide multi-lingual assistance. Twelve municipal systems afford citizens the ability to track service requests. Of those twelve, nine municipalities maintain a call-in service number, while the remaining three use web-based tracking.

Service

Our survey focused on the following service areas: animal control, child and youth services, community services, education, emergency issues, health issues, housing services, legal aid, motor vehicle/transportation, parks and recreation, permit information, public safety, sanitation and street repair, senior citizen issues, utility issues, visitor information, and employment information. Results indicate that Hampton received the highest service score (27 out of a possible total score of 36). Somerville, Minneapolis, and Louisville all scored well, having merited section scores of 26, 25, and 24, respectively. Hampton, Somerville, Minneapolis, and Louisville received the highest service scores not only because these 311 systems provide a multitude of services, but also because they are able to process many of the service requests internally (Table 2). This is in contrast to other systems that handle service requests via transfer or merely provide information about such services. Table 3 below provides summary information regarding the types of service addressed via 311.

TABLE 2
311 System Performance Scores

Municipality (Alpha Order)	Raw Scores			
	Usability (out of 10)	Services (out of 36)	Operations (out of 10)	System Measures (out of 8)
Akron, OH	3	11	5	1
Austin, TX	5	19	3	2
Birmingham, AL	6	16	9	3
Chattanooga, TN	5	14	9	4
Hampton, VA	5	27	7	5
Houston, TX	7	17	6	6
Louisville, KY	8	24	5	2
Minneapolis, MN	6	25	7	5
Orlando, FL	7	18	7	3
Riverside, CA	4	17	7	1
Rochester, NY	5	10	2	4
San Antonio, TX	7	21	7	4
San Jose, CA	3	17	3	2
Somerville, MA	8	26	6	4

TABLE 3
Services Areas Addressed via 311

Service	Service Area Addressed n = 14	Processed Internally n = 14	Process via Transfer or Provide Information n = 14	Not Addressed n = 14
Street Repair	14	9	5	0
Permit Information	14	2	12	0
Emergency and Sanitation	13	1	12	1
Senior Citizen Issues	13	7	6	1
Utility Issues	13	1	12	1
Employment Information	13	4	9	1
Public Safety	13	1	12	1
Animal Control	12	2	11	2
Health Issues	12	9	3	2
Parks and Recreation	12	1	11	2
Housing	12	3	9	2
Child and Youth Services	11	2	9	3
Community Service	11	1	10	3
Motor Vehicle/Transportation	11	2	9	3
Visitor Information	10	1	9	4
Education	8	0	8	6
Legal Aid	8	0	8	6
	6	0	6	8

Operations

Birmingham and Chattanooga received the highest operations score (9 out of possible 10). Hampton, Orlando, Riverside, and Minneapolis scored favorably in this performance area as well, all having received scores of seven. Rochester scored poorly, having received an operations score of two. More specifically, the data indicate that only Chattanooga, Hampton, and San Antonio are able to route calls to multiple locations based on geographic area from which the call originated. Nine of the 14 of the municipalities surveyed are able to route calls based upon time of the day or the day of the week. Five of the municipalities are unable to route calls based on time or day. Ten of the 14 systems include online internet submissions/requests, while eight call centers allow for walk-in

inquiries. Nine of the systems have methods in place to drive simple requests for information through a self-service or web channel.

The vast majority of 311 call centers underscore staff training, as 12 of 14 municipalities provide at least two weeks of such capacity building training. Minneapolis and Orlando provide eight weeks of training, while Louisville and Houston provide six weeks. Seven 311 systems have technology that supports tracking service requests through telephony or electronic channels for citizens, while nine have systems that automatically determine service areas based upon GIS or physical address information.

System Measures

Houston received a system measures score of six (out of eight) and both Minneapolis and Hampton received scores of five. In contrast, Riverside and Akron received scores of one. The data further indicate the majority of the 311 systems emphasize keeping caller wait time to a minimum. Specifically, nine of the 14 systems have average wait times that are 60 seconds or less. Accountability and security/ privacy are points of emphasis as well. Nine call center systems provide mechanisms whereby citizens can provide feedback regarding the quality of 311's customer service. Moreover, eight municipalities have security/privacy policies. Only Chattanooga, Minneapolis, and Houston have 311 systems that perform "intelligent" capture of information learned on an ongoing basis in the course of delivering information and services.

Summary of Survey Results

Overall, the data indicate that Hampton and Somerville's 311 call center systems were most highly rated, each receiving a total performance score of 44 out of a possible 65. Minneapolis was close behind, receiving a score of 43. Louisville and San Antonio fared well, as both merited scores of 39. In contrast, Akron and Rochester received scores of 20 and 21, respectively. From a usability perspective, Louisville and Somerville are models in that both systems allow for transfers to other people in the 311 center/group or to other departments. Also, when a caller is transferred, that person does not go back into another queue; rather, they are directed to a live person. Somerville further notifies callers as to their expected wait time or their position in the queue. Louisville, Somerville, Austin,

Rochester, and San Antonio provide 24/7 service. Of the remaining nine municipalities that do not provided 24/7 311 service, four provide an automated information system. The growing diversity of the American population increases the need for multi-lingual caller center representatives. As such, eight systems have agents in place that are multi-lingual. Furthermore, giving callers the ability to track service requests is an important usability function of 311. Twelve of the municipal systems examined here provide such a function (Table 4).

In terms of services, Hampton, Louisville, Somerville, and Minneapolis have best practices. The common thread among these municipal systems is that they are able to process a significant number of service requests directly through their 311 call centers. In other words, they do not have to transfer a caller to another department in the hopes that the service request will eventually be filled. Directly processing a service request is far more efficient and convenient for the citizen, thereby enhancing responsiveness.

With regard to operations, Chattanooga and Birmingham received the highest operations scores (9 out of possible 10). Hampton,

TABLE 4
Summary Scores

Municipality	Total Raw Score (out of 64)	Weighted Score (out of 100)
Somerville, MA	44	66.89
Hampton, VA	44	66.50
Minneapolis, MN	43	66.28
San Antonio, TX	39	61.33
Houston, TX	36	59.89
Louisville, KY	39	57.67
Orlando, FL	35	55.50
Birmingham, AL	34	55.28
Chattanooga, TN	32	53.56
Riverside, CA	29	43.39
Austin, TX	29	42.11
San Jose, CA	25	35.89
Rochester, NY	21	35.11
Akron, OH	20	30.72

Orlando, Riverside, and Minneapolis scored favorably in this performance area as well. Some of the common threads among these six municipal systems include: call routing based upon time of day or day of week; the 311 center database is SQL in nature; the 311 system includes online internet submissions/ requests; the system technology tracks service requests through telephony and/or electronic channels. Furthermore, each of these best practices, with the exception of Riverside (10 days), require at least two weeks of training for call center representatives. Minneapolis and Orlando require eight weeks of training. Finally, the better 311 systems: (1) keep caller wait times to a minimum, (2) ensure that only a small percentage of calls are handled via Interactive Voice Response, as opposed to a live agent, (3) provide callers with a means of providing customer service feedback, and (4) have a means of safeguarding a caller's privacy.

CONCLUSION

Based on our survey of existing 311 systems, we have synthesized criteria for an effective 311 system. Those systems which are most effective culminate in a government's effort to be both responsive and accountable to its public. The following criteria are categorized into three functional areas: usability, operations, and system measures. These criteria help 311 systems meet both accountability and responsiveness expectations. Having a system that is 24/7, for example, will only help increase government accountability. Similarly, the ability to utilize feedback measures integrated into a system allowing for a better understanding of where and how often incidents occur, will only improve responsiveness. Overall, the following criteria is not an exhaustive list, but have been noted as critical to optimal performance by 311 systems.

Usability

- Providing 24/7 access to 311 with a live operator. Such access to a live operator enables citizens to contact the city at any time, and provides citizens with the feeling that the city is there to address their issues at any time.
- Clear goal for wait time from the time the IVR ends to the time a call is answered by a live operator. This establishes a benchmark

for performance for the city's call center. It also ensures that a prompt response to callers is a priority of the 311 system.

- Notifying callers as to their position in the queue or expected wait time. This provides information to and demonstrates consideration for the caller.
- Caller receives a tracking number for incident. The tracking number tells the caller their issue has a unique identification number and that the caller can refer to it in future communications.
- Provide multi-lingual assistance which allows non-English speaking callers to communicate with the 311 system and receive the same service as English speaking callers.

Operations

- Capability for IVR messages. While IVR messages affect the time it takes for a caller to contact a live operator, these messages usually address the most common reasons callers contact the 311 system. Overall, this reduces the time for callers to receive the information they need. IVR messages should be used only after careful consideration.
- GIS capability. The primary use of GIS capability in 311 systems is to insure the information received about an address is correct so that the issue can be resolved. This capability is not intended to interfere with the privacy of callers.
- Capability of handling service requests. An advanced 311 system would have the capability of handling service requests via the call center directly. At a minimum, the system should be capable of transferring callers to the appropriate individuals and/or agencies. This enables the caller to speak directly to the individual and/or agency that can address the caller's issue.
- Insuring proper training of staff. Proper training is critical to the successful operation of a 311 system.
- Use of Internet for access to system and tracking of incident by caller. A 311 system that has Internet access will encourage more use of the system by citizens who prefer that mode of

communication. It will also provide ease of communication to track a specific issue.

- Interaction of 311 and 911. The interaction of the 311 and 911 systems is essential to refer callers who have dialed the wrong service. Emergency calls made to the 311 system can be quickly routed to the 911 system.

System Measures

- Providing callers with a feedback mechanism regarding the quality of a 311 system. Feedback on citizen experience with the system provides knowledge of what is and what is not working. This enables the system to be improved and will increase participation and citizen involvement with the 311 system.
- Supporting the capture of information on the performance of agencies in resolving the issues raised by callers to the 311 system. Was the problem fixed and how long did it take to fix it? The capability of capturing performance information of agencies should be incorporated into a 311 system in the planning stages whether or not this information is collected in the initial phase of the system. Once performance information is in a 311 system, it can be more easily activated in a later phase of the system than modifying the system to collect this data.
- Determining how to use the 311 system to measure agency performance in responding to caller incidents. Data from the 311 system can be used to establish performance standards and improve the functioning of government.

According to Butterfield (2006), 311 systems were initially viewed with skepticism by the technology industry. However, the interest and growth in 311 implementation says a great deal about the potential of this innovative use of an existing technology, namely the ability to positively alter the relationship between government and citizens (Peterson, 2006). The impetus for continued 311 growth is that public officials have observed the benefits of 311 systems in terms of citizen accessibility, responsiveness to the concerns of citizens, improved management of government services, and enhanced accountability and performance of these services. This research indicates that the cities of Hampton Somerville and Minneapolis have implemented 311 systems that incorporate a number of functional

elements that contribute to their cities being more responsive to citizen information and service needs, as well as ensuring that such needs are met adequately and in a timely manner. Future studies should perhaps go beyond the functional aspects of 311, examining the impact of 311 on citizens' perceptions of governmental responsiveness and accountability.

REFERENCES

- Barnhouse, B. (2008). "Lynwood: One Call City Hall." *Call 311: Connecting Citizens to Local Government Case Study Series*. Washington, DC: International City/County Management Association.
- Berman, E. (1997). "Dealing with Cynical Citizens." *Public Administration Review*, 57 (2): 105-112.
- Butterfield, E. (2006). "311 systems come of age." *Washington Technology*. 21(3). [On-line]. Available at http://www.washingtontechnology.com/print/21_3/27973-1.html. (Retrieved April 28, 2008).
- Calista, D., & Melitski, J. (2007). "E-government and E-governance: Converging Constructs of Public Sector Information and Communications Technologies." *Public Administration Quarterly*, 32 (1): 87-120.
- City of Oakland. (2002). "Moving Oakland Forward." City Manager Summit Recommendations. [On-line]. Available at http://www.oaklandnet.com/movingforward/8CRecommendation_sDetailed.pdf. (Retrieved May 10, 2005).
- Cloete, F. (2003). "Assessing Governance with Electronic Policy Management Tools." *Public Performance and Management Review*. 26 (3): 276-290.
- Eagle, J. (2004). "Transformational Technology." *Government Technology*. [On-line]. Available at www.govtech.com/gt/articles/91953. (Retrieved April 29, 2008).
- Eichenthal, D. (2005). "Citizen Perspectives on Measurement of Local Government Performance in Chattanooga, Tennessee." *Community Research Council, Inc.* [On-line]. Available at

- <http://www.researchcouncil.net/Projects/chattanoogaCITIZEN/chattanoogaCitizen0328.pdf>. (Retrieved April 28, 2008).
- Fleming, C., & Barnhouse, B. (2006). "San Antonio: Customer Service/311." *Call 311: Connecting Citizens to Local Government Case Study Series*. Washington, DC: International City/County Management Association.
- Fulla, S.L. (2007). "The Citizen and CRM." In S. C. Kavanagh (Ed.), *Revolutionizing Relationships: the Promise of CRM Systems for the Public Sector*. (Technology Solutions Series). [On-line]. Available at http://www.gfoa.org/documents/CRM_000.pdf. (Retrieved April 28, 2008).
- Holzer, M., Carrizales, T., Schwester, R., Melitski, J. & Shick, R. (2007). "Developing a Statewide 311 System in New Jersey." National Center for Public Performance, E-Governance Institute: Rutgers University-Newark. [On-line]. Available at http://icma.org/documents/NJ_311_Feasibility_Study_9-7-07.pdf. (Retrieved April 28, 2008).
- Kavanagh, S.C. (2007). "An Introduction to CRM." In *Revolutionizing Relationships: The Promise of CRM Systems for the Public Sector*. Shayne C. Kavanagh (ed). Technology Solutions Series: Government Finance Officers Association. [On-line]. Available at http://www.gfoa.org/documents/CRM_000.pdf. (Retrieved April 28, 2008).
- Kiviat, B. (2005). "The Magic Number." *Time-CNN*. [On-line]. Available at www.time.com/time/magazine/article/0,9171,1022591,00.htm. (Retrieved April 29, 2008).
- Mazerolle, L., D. Rogan, J. Frank, C. Famega, & J. E. Eck. (2003). "Managing Citizen Calls to the Police: An Assessment of Non-Emergency Call Systems." U.S. Department of Justice, National Institute of Justice. [On-line]. Available at <http://www.ncjrs.org/pdffiles1/nij/206256.pdf>. (Retrieved May 10, 2005.)
- Norris, P. (2001). *Digital Divide: Civic Engagement, Information Poverty, and the Internet Worldwide*. Cambridge: Cambridge University Press.

- Peterson, S. (November 2006). "Phone Banks." *Government Technology*. [On-line]. Available at www.govtech.com/gt/articles/102125. (Retrieved April 28, 2008).
- Solomon, S.E., & Uchida, C.D. (2003). "Building a 3-1-1 System for Non-Emergency Calls: A Process and Impact Evaluation." [On-line]. Available at www.cops.usdoj.gov/files/ric/Publications/buildinga311systemaustinevaluation.pdf. (Retrieved April 20, 2007).
- U.S. Department of Justice (2006). "COPS Fact Sheet: 311 for Non-Emergencies." Office of Community Oriented Policing Services. [On-line]. Available at www.cops.usdoj.gov/files/ric/Publications/e01060007.pdf. (Retrieved April 20, 2007).
- Welsh, W. (2001). "Integrators Answer the Call for 311 Services." *Washington Technology*. 16(13). [On-line]. Available at http://www.washingtontechnology.com/print/16_13/17185-1.html?topic=state. (Retrieved April 29, 2008).
- West, D.M. (2004). "E-government and the Transformation of Service Delivery and Citizen Attitudes." *Public Administration Review*, 64 (1):15-27.

APPENDIX A Survey Framework

<i>Usability</i>	
1-3. Transfers and Tracking Calls	6. Automation
4. Wait time	7-9. Language
5. Hours of operation	10. Citizen tracking
<i>Service</i>	
11. Animal Matters	20. Recreation and Park Issues
12. Children and Youth Services	21. Permit Information
13. Community Services	22. Public Safety Issues
14. Educational Issues	23. Sanitation Issues
15. Emergency Issues	24. Senior Citizen Issues
16. Health Issues	25. Street Repair Services
17. Housing Services	26. Utility Issues
18. Legal Issues	27. Visitor Information
19. Motor Vehicle/ Transportation Issues	28. Employment Information

APPENDIX A (Continued)

<i>Operations</i>	
29-30. Call Routing	35. Driving requests
31. Database	36. Service measures
32. Internet	37. Telephony tracking
33. Training	38. GIS Systems
34. Walk-in	
<i>System Measures</i>	
39. Wait time measure	44. "Intelligent" data capture
40. IVR load	45. Security/privacy
41. Calls per agent	46. Shared service
42-43. Feedback	