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A Study of Arkansas County Government Web Sites[1]

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Increasingly, governments are trying to communicate with their citizens, residents, visitors and other governments through their web sites. Significant efforts have been made on this level at the international, national, state and city levels. But despite the great amount of business citizens transact with counties, there is little study of the quality of county web sites. This paper undertakes a study of all 75 Arkansas county e-government web sites to assess their presence and quality. Various scoring and statistical measures were utilized. At the time of the study, less than half the counties had a web site. Most were found lacking in the areas of accessibility, accountability, democratic participation and transparency. Socioeconomic factors that had a statistically significant impact on web site quality and presence were population, age, high school education, college education, race and Congressional districts. The presence of larger minority populations had a neutral effect on web site quality and presence.

Introduction

When Curtin, Sommer, and Vis-Sommer (2003) first published their seminal book on the status of e-government around the world, they considered e-government to be in its infancy. They even found it hard to come up with a precise definition of e-government, which they eventually defined as "governing populations through the use of online information and services" (Curtin, Sommer, and Vis-Sommer 2003, 215). They distinguished this from e-commerce, which they defined as "commercial transaction[s] online, frequently linked to social regeneration in the new economy," and from e-democracy (which some now call e-participation), which they defined as "using technologies to enhance democratic practice" (Curtin, Sommer, and Vis-Sommer 2003, 215).

Others have since said that government web sites are becoming primary gateways to information and service delivery for citizens and businesses, with the goals of efficiency, convenience and civic engagement (Freeman and Loo 2009). To make e-government effective, governments must combine

information, communication technology and administrative practices in ways designed for use by citizens, business and other e-governments (Deakins and Dillon 2002; Seifert and Relyea 2004).

Prior to Curtin, Sommer, and Vis-Sommer (2003), Symonds (2000) defined four stages of e-government as (1) simple information, similar to that of an electronic brochure, (2) the beginning use of technology that allows those who deal with government to enter information, make requests and possibly update information (weak interactivity), (3) an instrument for allowing online transactions/purchases, and (4) a portal that integrates government services and information, has a sophisticated search engine, and includes metadata. Others have continued to place a focus on this in their evaluations of the developmental stages of e-government and of adopters (Brainard and McNutt 2010; Carter and Bélanger 2005; Jun and Weare 2011; Lane and Lee 2001; Lee 2010; Manorahan 2013; Moon 2002; "United Nations Global e-Government Readiness Report 2005"; Whitacre 2010).

Curtin, Sommer, and Vis-Sommer (2003) cited many purposes of e-government, including making government more accessible and accountable to citizens and businesses; making it more collaborative with other e-governments; providing transparency of information to enhance citizen decision-making and democratic participation; and encouraging communication between citizens and government as a means of promoting participation in government. Many other authors since have echoed the same sentiments, including those already mentioned.

To be useful to all citizens, e-government must also be accessible to the disabled. Thus Jaeger (2008) says that e-government web sites must provide "equal or equivalent" access to information to those with disabilities and "seamless compatibility with assistive technologies," as well as "promote capability with assistive technologies" for users (88).

Government transparency involves citizen access to government information (Bertot, Jaeger, and Grimes 2010). Various other authors have noted that such transparency is now regarded internationally as necessary to promoting democratic participation, confidence in government, informed decision-making and government accuracy, as well as to attempting to prevent government corruption, among other functions (Cullier and Piotrowski 2009; Mulgan 2007; Quinn 2003; Reylea 2009; Shuler, Jaeger, and Bertot 2010). However, efforts to promote government openness and reduce corruption are heavily influenced by culture, including attitudes various

cultures might have about the value of government information, how citizens identify with their governments, the functionality of an independent media, and government information policies (Brown and Cloke 2005).

e-Government increasingly is being studied by scholars from a variety of other angles. These include whether the government rhetoric regarding the evolution of e-government matches the realities as it relates to municipalities or cities. Indeed, it appears it has not produced many expected cost savings and the downsizing that e-government rhetoric has promised and that financial, technical, personnel and legal barriers are widely shared. Further, the type of city government can affect adoption of sites and their longevity (Moon 2002). Other studies include assessments of whether there are gender gaps in online civic participation. Some findings here are that social status appears to be a better predictor than gender at explaining participation (Fuller 2004). Some have studied e-government from the standpoint of Old Public Administration vs. New Public Management (or New Public Service), as it relates to Washington, D.C., police and local residents in online discussion groups. It was found that most activity was more old style, in that it is informational and transactional, rather than being more new style, or collaborative (Brainard and McNutt 2010). Still others have looked at whether e-government enhances government-citizen trust. Some scholars have found that it may help improve citizen confidence in the future performance of the agency, but it has not provided hoped-for greater satisfaction with agency interaction or improved general trust in the federal government (Morgeson, VanAmburg, and Mithas 2011). In studies of the effects of information technology on policy decision-making processes in metropolitan areas of South Korea using the technology and decision-making theories of contingency, environmental scanning and goal setting, searching alternatives, and barriers of information sharing, it has been found that there is progress, but more is needed (Myeong and Choi 2010). Finally, in terms of institutional motivations for adoptions e-government, Jun and Weare (2011) found that e-governance may evolve to make local governments more responsive to external constituencies if there are fewer barriers to change.

A study of web site development among smaller local governments in Northeast Ohio found the growth in e-government is not uniform and must take into account societal factors (Cassell and Mullaly 2012). When it comes to the diffusion of Internet technologies in rural communities, infrastructure is increasing in importance in Oklahoma, as knowledge of the Internet spreads (Whitacre 2010). Additionally, there has been a study of the factors

affecting local use of e-government, especially counties, as further discussed below (Manorahan 2013). Many studies have been at the state and local levels, and a variety of these have been case studies, such as this one.

Manorahan's (2013) study is probably the most relevant here. Nevertheless, he affirms that despite the increasing range of online services that U.S. counties provide, there is a lack of study in this area. Again, he affirms that much of the research has focused on both cities and counties, or mainly on municipal e-government. Few studies have focused on county e-government alone. This study also seeks to help correct that.

Indeed, counties are a very important part of government, and their e-government presence should reflect that. But despite their importance, many of the author's students cannot even identify what counties do.

The 3,069 U.S. counties own, operate and oversee many services, including drivers' licenses, elections, emergency services, health care (including health departments, hospitals, nursing homes and mental health facilities), infrastructure (including roads and bridges), parks and recreational facilities, police and judicial systems, public transportation, restaurant inspections, record-keeping, and solid-waste management, among other areas (Istrate and Nowakowski 2013; "Why Counties Matter" 2013). Counties elect more than 19,300 board members and executives, invest $482 billion in public services for 296 million residents, and employ 3.3 million people (Istrate and Nowakowski 2013). County governments also are centers of societal trends, especially if they have seen large population increases that demand expanded governance ("History of County Government Part I" 2013). And, like the states are seen as 50 laboratories of democracy, counties are viewed as the nation's most flexible, locally responsive, and creative types of U.S. government. Certainly they are the most diverse, varying impressively in size, population, geography, and governmental structure. In their politics and policies, they express the 1990's political slogan, "Think globally; act locally." ("History of County Government" n.d.).

Manorahan (2013), whose study of county e-governance includes the categories of e-information, e-transactions, and e-participation, confirms literature that says that one key to e-government sophistication in counties is greater support from elected officials, as they can act as institutional catalysts for innovative technologies. Yet, he says elected officials seem to be less supportive of e-transaction and e-participation modalities. Certainly these modalities were lacking in many of the counties studied here. Yet

Manorahan (2013) says that county information technology (IT) budgets are not the predictor of the variability in e-government services. Rather the key is how many functions county web sites provide, as is studied to an extent here. Counties that provide more functions also provide more sophisticated e-government (Manorahan 2013). Further, they seemed more willing to adopt e-government to integrate functions across departments.

Additionally, counties that contract out their IT services (much of this was seen in this study, although not measured), collaborate with other counties, and have more educated residents tend to provide more sophisticated e-government practices, going beyond just e-transactions (Manorahan 2013). However, e-participation levels continue to lag. Also important to this study, Manorahan (2013) concludes that education levels "set a level of expectation for government in developing their web sites," (159) similar to the findings of Weare, Musso and Hale (1999).

Manorahan (2013) says that while county officials may at first support e-government, in the long run some are still uncomfortable, unfamiliar and uneducated about the Internet and its uses. This in turn leads to a lack of sustained commitment (although not studied here, additional visitations to Arkansas county sites shows a level of quality variability that is not always improvement-oriented). Additionally, while this study has not measured enthusiasm by officials, the variety of dysfunctions and lack of updates noted on the sites studied appears to support a lack of sustained commitment by some officials.[2]

Manorahan (2013) also points out that using contractors to manage citizens' personal information presents privacy and control issues for counties. Many of the sites studied here indicated there was a contractor involved. Manorahan (2013) recommends providing more IT training to employees to increase stakeholder support of e-government. He also recommends that states provide leadership, funding, support, and recognition of best practices for counties regarding e-government. He concludes by reinforcing the findings of this study that although counties play an increasing role in regional economic development, there is limited information on county e-government efforts. This reflects the view of other

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[2] Indeed, at an April 7, 2015, presentation in Jonesboro, Arkansas, by the author's students on the best and worst practices of a sampling of Arkansas county web sites at which some county officials were in attendance, conversations afterward indicated these officials were aware of some of these shortcomings. They indicated a desire for further study and guidance.

scholars, who say e-government communication used by local governments, including counties, is rarely monitored or analyzed (Williamson and Parolin 2013).

Methodology

Given the importance of e-government and counties, this study embarked on a study of all 75 Arkansas counties during the period of January 17, 2012, to December 11, 2012, to measure if they had a web presence and to assess the quality of their e-government efforts. This was done by reviewing each county web site in Arkansas to see if it met the qualifications noted here, and then reviewing those that did so in depth manually. Specifically, this paper studies Arkansas county web sites in terms of their accessibility, accountability, democratic participation, and transparency, all qualities that scholars have identified as necessary components of e-government, designed to promote citizen ability to monitor and participate in a level of government they use in many ways.

The study then uses this evaluation to analyze whether socioeconomic factors have a significant impact on the quality and presence of these web sites. Thus it correlates the above findings with such factors as population, age, high school education, college education, Congressional districts and race as control variables. For these socioeconomic factors, two types of statistical analyses were run – one being a logistic regression when the dependent variable was dichotomous (presence or non-presence of a web site) and the other being an ordinary least square regression model (OLS) when the dependent variable was a continuous variable (overall quality).

The author was the sole data collector for this paper. The author had overall responsibility for evaluating the quality of the data and overseeing the entire project, much of which involved reviewing web sites manually.

Arkansas was chosen as a case study because although it is a growing state containing eight of the nation's Fortune 500 companies (among them the number-one-ranked company, Walmart, the world's largest retailer, and the 83rd ranked company, Tyson Foods),[3] it also has many areas that remain remote, rural, poor, have high unemployment and lack diffuse Internet

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[3] Others ranked in the Fortune 500 are Murphy USA (202), Murphy Oil (350), Dillard's (400), J.B. Hunt Transport Services (434), and Windstream Holdings (452) ("Fortune 500 by Rank, Arkansas" 2015). Northeast Arkansas boasts the largest rice production in the nation, with Riceland Foods ("Arkansas Farming Facts" 2014).

access. It ranks third lowest in average four-year public college graduation rates within four years (20.6%), just above Alaska at 10.4%, and the District of Columbia at 5.7% ("College Completion" 2015).[4] And in Internet connectivity, Arkansas ranks third highest in the percentage of citizens who do not have an Internet connection anywhere, at 38.7%, barely edging out New Mexico at 39.6% and the least connected, Mississippi, at 41.0%, based upon the U.S. Census Bureau's 2011 current population survey data ("Internet Connectivity Usage Statistics by States" 2013). As *Governing* magazine researchers note, such connectivity disparities persists, particularly for those of certain ethnic groups and income ("Internet Connectivity Usage Statistics by States" 2013). While this gap has shrunk slowly in recent years, thanks in particular to Smart phones (which have their limitations), it is worth noting that "areas with the highest proportion of residents lacking Internet connections are mostly found throughout the South and Appalachia" ("Internet Connectivity Usage Statistics by States" July 2013, paras. 3 & 4).

Moreover, Arkadelphia in southern Arkansas is involved in supplying aerospace materials through HITCO Carbon Composites, a "major supplier of composite aerostructures assemblies and high temperature materials to the aerospace and industrial markets" (Cohen 2014, para. 1), parts of southern Arkansas and its Mississippi Delta region have near Third World conditions.

Additionally, while the United States ranks 5.06 on the Human Development Index, which measures health, knowledge and standard of living as one number, Arkansas ranks 3.91, just above the lowest-ranked state of Mississippi (3.81). The HDI is a tool for world governments to compare countries in ways that do not rely just upon the Gross Domestic Product alone ("Mapping the Measure of America" 2011).

Thus what adds poignancy to this study is the contrast between a growing state with such heavy-hitting industries and yet such a disparity of access to Internet services, as well as a very low standard of well-being and opportunity, especially in southern and Delta regions of the state. Using data from such a bifurcated state as Arkansas for this study therefore provides some least-similar comparisons when state government influence is held constant.

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[4] As a point of reference, Delaware ranks first with a 59.3% college graduation rate ("College Completion" 2015).

For the purposes of the study, "presence" is defined as whether or not the county government has what is considered to be a stand-alone web site (meaning it is provided by the county government itself and not a part of a city or state government site) and had its own domain name (all of which less than half the counties had).

Arkansas has 75 counties, and during the time of this study, only 33 had a web site. Of these, only 31 met the eligibility criteria for this study. Lafayette County and Sharp County did not at the time have web sites, but they also were excluded from this study because they were integrated into the Arkansas.gov state portal web site and so were not stand-alone sites.

"Quality" of a web site is defined by a number of factors: number of available features (including information on property assessment, online bill/fine payment options and county road development), W3C disability standards, the simplicity of readability levels, the availability of a Spanish-language option, the availability of a search mechanism, the provision of budgetary and official meeting information, a tested e-mail response time, full contact information and information on voting. Quality was scored on a scale of zero to 19, with the higher score linked to higher quality.

The study then correlates the potential effects of population, age, high school education, college education, positioning in a Congressional district and race (independent variables) on web site scores or presence (dependent variables). To do this, a simple scoring system of stand-alone web sites is used to determine the availability of features and the site's accessibility. Only those sites that had a stand-alone web site were scored.

The totals of these evaluations of the four sections of accessibility, accountability, democratic participation (identified as overall DP) and transparency were then added to form the overall web site score. The statistical analysis was run using STATA. The maps were created using ArcGIS.

An analysis of multi-collinearity was conducted for all the independent variables used in the statistical modeling. Based on the Variance Inflation Factor scores (VIF), the average VIF of all models were well below the threshold value of 2.00, indicating that none of the variables on the right hand side of the regression equation were collinear (Fox 1997). Furthermore, a correlation matrix indicated that none of the right-hand side variables were correlated, with Pearson's R-values for all independent and control variables

well below 0.5000. A more detailed description is now provided for the quality indicators, followed by the results for each.

Accessibility

Accessibility measures were used to determine whether citizens had appropriate access to county government web sites. These measures include compliance with W3C disability standards, Flesch-Kincaid readability statistics, and the availability of a Spanish-language option.

The World Wide Web Consortium promotes widely accepted web site development standards (Web Accessibility Initiative 2012). Among these standards is the Web Accessibility Initiative (WAI), which provides guidelines for making web sites accessible to persons with disabilities. These accessibility standards are supported at the federal government level ("Accessibility of State and Local Government Websites to People with Disabilities" 2003). The W3C has a list of endorsed tools for gauging the accessibility of web sites (Web Accessibility Initiative 2012). The study used tools from the W3C list that are designed to test accessibility for users with color blindness ("AccessColor – Online Tool for Colour Contrast" 2012) and partial or full blindness ("Accessibility Check" 2012).

The home address for each Arkansas county government web was entered into each of these tools for testing. Based on the results of the tests, each web site received a score from 0 to 1. If a web site passed both accessibility tests, it received a score of 1. If a web site failed either test, or was not able to be tested because of improper coding or Internet Protocol (IP) restrictions, it received a score of 0.

The Flesch-Kincaid readability score was used to determine the average grade level of the text within a web site. The average completed grade level of citizens scoring in the lowest section of the 1993 National Adult Literacy Survey was the eighth grade ("Adult Literacy in America" 1993). To ensure that Arkansas county government web sites are accessible to citizens with even the lowest level of literacy, the study employed an online tool designed to test web sites for readability. The tool, provided by JuicyStudio, was used to perform the readability test ("Readability Test" 2012). The address for a text-heavy page (usually the home page or a county history page) was entered into the readability tool. The Flesch-Kincaid grade-level score was then used to determine the grade level of the text on the web site. The web site was assigned a score from 0 to 2. If the web site contained text that

registered 8.99 or lower on the Flesch-Kincaid grade level, it received a score of 2. If the web site contained text that registered between 9.00 and 10.99 on the Flesch-Kincaid grade level, it received a score of 1. If the web site contained text that registered 11.00 or higher on the Flesch-Kincaid grade level, it received a score of 0.

The Spanish-language option measure checked each Arkansas county government web site for a Spanish translation option, as Spanish is the second most commonly used language in the United States. Each site was searched for a Spanish-language option and assigned a score from 0 or 1. If a web site had an option to view the site in Spanish, it received a score of 1. If a web site did not have an option to view the site in Spanish, it received a score of 0.

Each web site was given an overall accessibility score, earned by adding together the scores for W3C, Flesch-Kincaid readability and Spanish language option. Each web site could earn a maximum of 4 points in overall accessibility.

Accessibility Results

Arkansas county government web sites performed poorly in overall accessibility. The average accessibility score for county web sites was 1.97 out of 4. There were extremely low scores in W3C disability testing and in the availability of a Spanish-language option. The average score in each of the two categories was 0.03 out of 1. Only one web site – Yell County – passed both disability tests, and only one web site – Carroll County – offered a Spanish translation. However, all but three web sites scored 2 out of 2 on the Flesch-Kincaid readability assessment, and no web sites scored 0.

Accountability

Accountability measures were used to determine if each web site delivered traditional county services online. The services evaluated included property assessment, online bill or fine payment, and information about county road development. Each web site received an overall accountability score by totaling the scores from each service evaluation.

Property assessment is a commonly known function of county government ("Overview of County Government" 2012). Traditionally, citizens have been required to visit a county office or mail in a request for

property assessment. With e-government, ideally they should be able to do this via the county's web site, given that many government web sites have started allowing financial transactions online (Curtin, Sommer, and Vis-Sommer 2003), including allowing web-based payments to the government (Chen et al. 2006).

Each Arkansas county government web site was searched for property assessment information and then assigned a score from 0 to 2. If a web site offered a link to online property assessment, it received a score of 2. If a web site offered instructions on how to request property assessment or a printable form to request property information, the web site received a score of 1. If a web site did not offer instructions on how to request property assessment, the web site received a score of 0.

Sites were searched for bill and fine payment options, and each assigned a score from 0 to 1. If a web site had the option to pay bills or fines online, it received a score of 1. If it did not have the option to pay bills or fines online, it received a score of 0.

As mentioned, county road development is another major function of county governments ("Overview of County Government" 2012). Each Arkansas county government web site was searched for information regarding the development and condition of county roads, and assigned each site a score from 0 to 2. If a web site provided information about county road development and county road conditions, it received a score of 2. If the web site provided only information about county road development, or only information about county road conditions, it received a score of 1. If the site did not provide information about county road development or county road conditions, it received a score of 0.

Each web site received an overall accountability score, earned by adding together the earned scores for property assessment, online bill and fine payment, and county road development. Each site could earn a maximum of 5 points for overall accountability.

Accountability Results

The average score for overall accountability for Arkansas county government web sites was 2.13 out of 5. Arkansas county government web sites scored low in two of the three accountability measures. The average score in bill or fine payment was 0.03 out of 1. This is because only Poinsett

County offered online bill or fine payment. Information regarding county road development was also lacking, with an average score of 0.84 out of 2. Many web sites provided either partial road development information or none at all.

Democratic Participation

An overall democratic participation measure was used to gauge whether Arkansas county government web sites promoted communication between government and citizens, as well as citizen participation in government. For this measure, web sites were checked to see if they had county officials' contact information and the availability of voter registration information.

Each site also was scanned for the email addresses and phone numbers of the county judge, [5]county clerk and sheriff. Partial information, including only a phone number or only an email address, earned no points in this measure. Each web site was assigned a score from 0 to 3. If a site provided email addresses and phone numbers for all three listed county officials, it received a score of 3. If a site provided email addresses and phone numbers for two of the listed county officials, it received a score of 2. If a site provided an email address and phone number for one of the listed county officials, it received a score of 1. If a site did not provide email addresses and phone numbers for any of the listed county officials, it received a score of 0.

Curtin, Sommer, and Vis-Sommer (2003) say that citizens want the ability to register to vote online. However, this option is not yet available in Arkansas. Each county government web site was searched for voter registration information and assigned a score from 0 to 1. If a web site provided voter registration information, it received a score of 1. If a web site did not provide voter registration information, it received a score of 0.

Democratic Participation Results

Arkansas county government web sites received an average score of 3.13 out of 4 in overall democratic participation. County web sites scored particularly high in the contact information measure, with an average score

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[5] County judges in Arkansas act as chief executive officers, holding only executive powers. They hold the highest county executive office in the county, similar to that of county executives in other states. They are the custodians of county property and public buildings. However, they have no power over other county executive officers, including sheriffs, county clerks, circuit clerks, treasurers, assessors, collectors and coroners (Goss 2014).

of 2.68 out of 3. However, county web sites received a low score in the voting information measure, averaging 0.45 out of 1.

Transparency

Transparency was measured to determine if Arkansas county government web sites were presenting information that the public should be able to access and to verify that emails from citizens were answered. Each web site was examined to see if it had a search bar, county budgets, and county meeting information. An email test was also conducted.

A search bar enables citizens to search an Arkansas county government web site for information. If a web site provided a search bar, it received a score of 1. If it did not, it received a score of 0.

County budgets are considered to be public information and an accounting of how tax money is spent. According to Curtin, Sommer, and Vis-Sommer (2003), citizens wish to access this information online. Each site was searched for a county budget and assigned a score from 0 to 1. If a web site provided access to the county budget, it received a score of 1. If it did not, it received a score of 0.

County meeting minutes are a matter of public record, and meeting schedules are required to be made publicly available. Curtin, Sommer, and Vis-Sommer (2003) say that citizens want access to this information online. Each site was searched for meeting schedules and minutes and assigned a score from 0 to 2. If a web site had meeting minutes and a meeting schedule available online, it received a score of 2. If it had only meeting minutes or only a meeting schedule available online, it received a score of 1. If a web site did not have meeting minutes and a meeting schedule, it received a score of 0.

Given that citizens, visitors, and others may want to contact county officials, a test email was sent to every county's county judge, where email addresses were posted. In each case, the question was posed, "Where is the court house located, and what are the hours of operation?" Email forms built into the web site were considered acceptable because replies are still sent to the email of the inquirer. Each site was assigned a score from 0 to 2. If a web site listed an email address for the county judge and a response to the email was received within 24 hours, the site was assigned a score of 2. If a web site listed an email address for the county judge, but a response was received

later than 24 hours, or no response was received at all, the web site received a score of 1. If a web site did not list an email address for the county judge, it was not tested and received a score of 0.

Each site was given an overall transparency score, earned by adding together the earned scores for the web site search bar, availability of budget information, availability of meeting information and the email test. Each web site could earn a maximum of 6 points in overall transparency.

<u>Transparency Results</u>

Arkansas county government web sites received an average score of 3.23 out of 6 in overall transparency. They scored low in three out of the four measures. Less than half the web sites included a search bar, giving county web sites an average score of 0.35 out of 1. Many web sites did not list budget information, earning them an average score of 0.39 out of 1 in this measure. Many sites also lacked meeting information, which led to an average score of 1.03 out of 2 for this information. The county web sites did score considerably higher on the email test, with an average of 1.45 out of 2.

Overall Web Site Score

The overall section scores of each county web site were added together for a total site score. Each web site could earn a maximum of 19 points if every evaluation measure was met. No web sites accomplished this. Carroll and Washington counties earned the highest web site scores, with 16 out of 19 possible points. Greene County earned the lowest web site score with a score of 3 out of 19 possible points. The average overall web site score for Arkansas county government web sites was 10.45 out of 19. Figure 1 indicates which counties had a stand-alone web site and shows the overall web site score range for each county web site.

Socioeconomic Factors

Web site scores were tested against socioeconomic factors to see if these had a significant influence on the web site scores or web site presence. The independent factors of population, age, high school education, college education, positioning in a Congressional district and race were examined for the potential effect on web site presence or quality scores, all found using information from the U.S. Census Bureau's 2010 datasets found using the 2012 "American Fact Finder" tool.

Figure 1: Map of Arkansas Counties with Stand-Alone Web Sites and their Overall Web Site Score
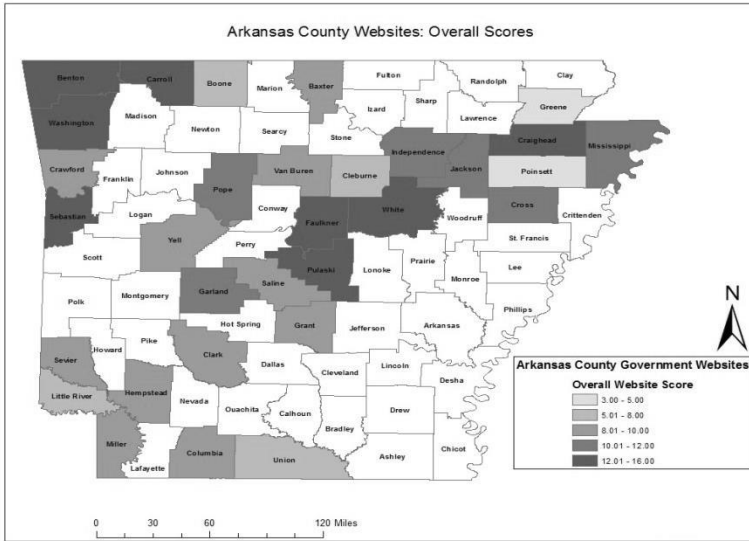
Source: Arkansas County government web sites and 2010 U.S. Census Bureau data.

At the time of this study, Congressional District 1 contained 28 counties, plus parts of two other counties. Aside from the city of Jonesboro (in Craighead County, home of Riceland Foods and Arkansas State University, the second largest public university in the state), the district remains largely rural, although growing quite fast. Congressional District 2 contained seven counties and included the capital city of Little Rock and its suburbs. Congressional District 3 contained six counties, plus parts of three other counties and the city of Fayetteville (home of the flagship University of Arkansas, Walmart, and Tyson Foods). Congressional District 4 contained 28 counties, plus parts of three others. While there are smaller cities, such as Hot Springs (a vacation destination) and Texarkana (a border city), the counties in this district are mostly rural and have lower levels of education.

The following hypotheses were advanced:

Hypothesis 1: As population of counties and levels of education increase, so will web site quality and presence.

Hypothesis 2: Counties with higher percentages of young adults will have better quality web sites and will be more likely to have a web site presence.

Hypothesis 3: As the percentage of the population with a high school diploma increases, so will web site quality and presence.

Hypothesis 4: As the percentage of the population with a bachelor's degree or higher increases, so will web site quality and presence.

Hypothesis 5: Congressional Districts 2 and 3 will have better quality web sites and will be more likely to have web sites presences. Congressional Districts 1 and 4 will be less likely to have a web site and will have poorer quality web sites.

Hypothesis 6: As the percentage of minority populations increases, the quality and presence of web sites will decrease.

The results of the tests can be seen in Tables 1 and 2.

Table 1: Effect of Age, Education, Population, and Congressional District on Overall Web Site Quality

	Overall Web Site Score							
Age 25-29	1.457*** (0.465)							
Bachelor's or higher		0.311*** (0.067)						
HS			0.150* (0.080)					
ln Pop				1.539** (0.567)				
CD 1					-1.732 (1.333)			
CD 2						1.300 (1.143)		
CD 3							2.922** (1.370)	
CD 4								-1.788** (0.840)
Const	1.525 (3.122)	5.256*** (1.327)	-1.718 (6.550)	-5.933 (6.223)	10.954*** (0.599)	10.20*** (0.656)	9.791*** (0.564)	10.913*** (0.724)
R^2	0.219	0.353	0.054	0.193	0.066	0.028	0.159	0.065
N	31	31	31	31	31	31	31	31
F-Stat	9.81***	21.62***	3.47**	7.37**	1.69	1.29	4.55**	4.52**

*$p < .10$, **$p < .05$, ***$p < .01$.; robust standard errors are in parentheses based on a two-tailed test. Data from Arkansas County government web sites, the 2010 U.S. census and "Arkansas Congressional Districts and Counties"

Population

County population was advanced as a possible cause of poor web site quality and the absence of a web site (Perkins 2012). Thus this study hypothesized that as population increases, so will overall web site quality

Table 2: Effect of Age, Education, Population, and Congressional District on Presence of Web Site by Arkansas Counties

	Presence of Web Site							
Age 25-29	0.788*** (0.282) [2.200]							
Bachelor's or higher		0.286*** (0.080) [1.331]						
HS			0.152** (0.063) [1.165]					
ln Pop				1.754*** (0.505) [5.782]				
CD 1					-0.431 (0.505) [0.649]			
CD 2						1.617* (0.860) [5.039]		
CD 3							0.821 (0.644) [2.275]	
CD 4								-0.873* (0.513) [0.417]
Const	0.788*** (1.651) [0.007]	-4.30*** (1.169) [0.013]	-12.5** (5.128) [3.86e06]	-18.0*** (5.015) [1.47e08]	-0.204 (0.289) [0.814]	-0.52** (0.254) [0.595]	-0.485* (0.261) [0.615]	-0.042 (0.293) [0.958]
Pseudo R^2	0.084	0.194	0.082	0.250	0.007	0.041	0.016	0.030
N	75	75	75	75	75	75	75	75

*p<.10, **p<.05, ***p<.01.; robust standard errors are in parentheses based on a two-tailed test; odds ratio in brackets. Data from Arkansas County government web sites, the 2010 U.S. census and "Arkansas Congressional Districts and Counties"

and presence. In this light, data on the Arkansas county population data was examined from the 2010 U.S. census ("Total Population: Arkansas by County 2010" 2012).

The population distribution in Arkansas is heavily skewed, with county populations ranging from 5,368 to 382,748. Therefore, the counties with large populations are significant outliers. To account for this skewed distribution, the raw population was converted to its natural log for analysis. The natural log of the population was first run against the presence of a web site variable to determine if population had a statistically significant effect on whether county governments have a web site.

The population hypothesis was confirmed. The effect of population on web site quality and presence was positively correlated and statistically significant. As population increases, so does the quality of web sites and the presence of web sites. The results of this test can be seen in Tables 1 and 2. Figure 2 shows a map of Arkansas counties by population. Figure 3 is a scatter plot showing a direct relationship between web site quality (overall web site scores) and population. It reveals that as county population increases, so does overall web site quality.

Figure 2: Map of Arkansas Counties by Population
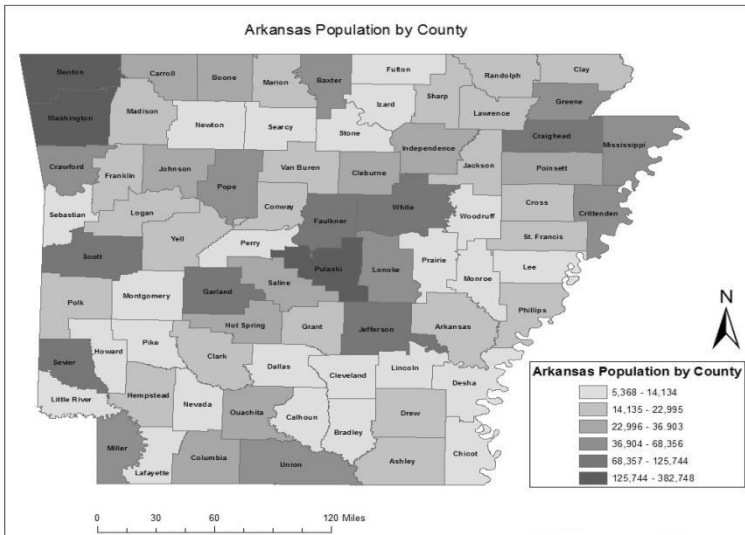
Source: Arkansas County government web sites and 2010 U.S. Census data

Age

Age was chosen as a socioeconomic factor to see if there was a generational effect on the presence and quality of Arkansas county government web sites. The hypothesis was that counties with a higher percentage of young adults would have better quality web sites and be more likely to have a web site. Ages 20 and older were examined in five-year intervals.

Each age group was run against the presence of a web site variable to determine if age had a statistically significant effect on whether or not a county government had a web site. Since the presence of a web site variable

Figure 3: Scatter Plot Comparing Arkansas County Government Overall Web Site Scores by the Population of the Counties
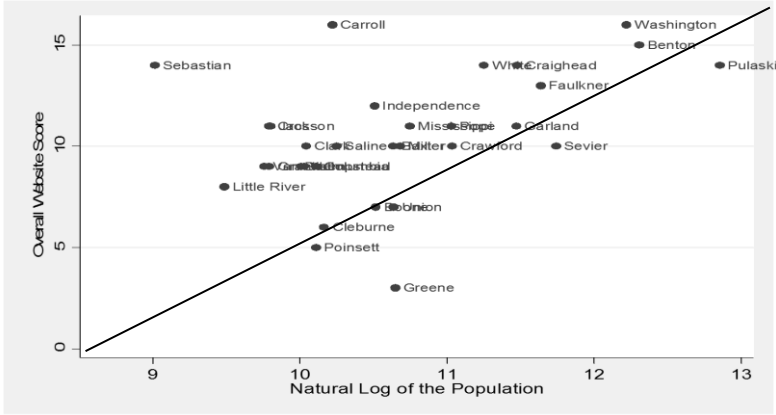
Source: Arkansas County government web sites and 2010 U.S. Census data

was dichotomous, a logistic regression model was run to obtain the coefficient, the odds ratio, and the p-value.

Each age group was then run against the overall web site score variable to determine if age had a statistically significant effect on the quality of county government web sites. This was tested this by running a linear regression model to obtain the coefficient and the p-value associated with overall web site quality.

The age hypothesis was confirmed. The impact on web site quality and presence of a web site in age groups beyond age 30 was not significant. However, age groups below 30 years did indicate an impact on web site presence and quality. This was particularly true of the 25 to 29 age group, which was statistically significant at 0.01 level for both web site quality and presence. Thus a youth effect on web site presence and quality can be observed. The results of this test can be seen in Tables 1 and 2. Figure 4 shows a map of Arkansas counties by percentage of population between the ages of 25 and 29. Figure 5 is a scatter plot showing a direct relationship between web site quality and the 25 to 29 age group. It shows that as the percentage of the population between the ages of 25 and 29 increases, so does web site quality.

Figure 4: Map of Arkansas Counties by Percentage of Population Between the Ages of 25 and 29
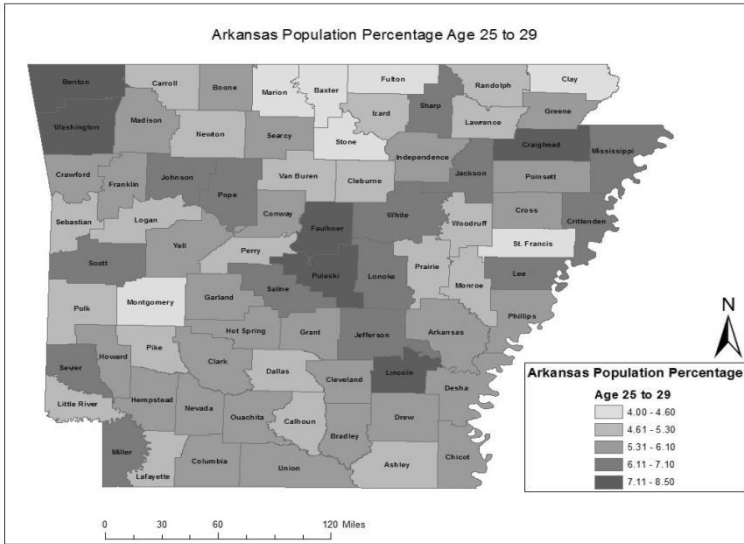
Source: Arkansas County government web sites and 2010 U.S. Census data

Figure 5: Scatter Plot Comparing Arkansas County Government Overall Web Site Scores by Percentage of the Population between the Ages of 25 and 29
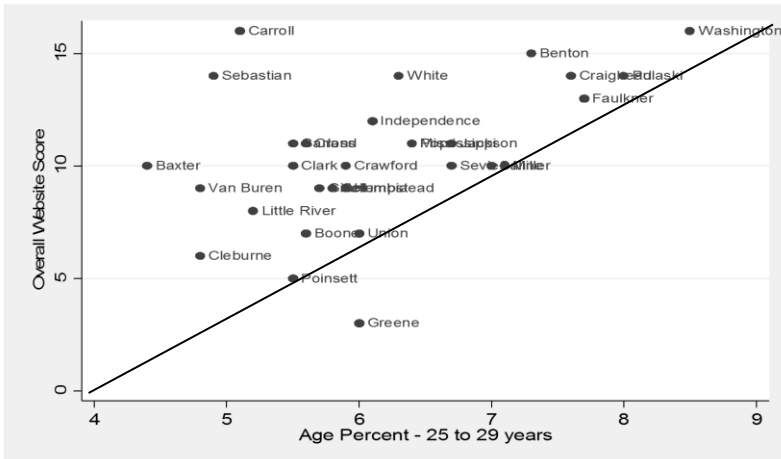
Source: Arkansas County government web sites and 2010 U.S. Census data

High School Education

The socioeconomic factor of high school education was chosen to see if the percentage of the population with a high school diploma had an effect on overall county government web site quality and presence. The hypothesis was that as the percentage of the population with a high school diploma increased, so would web site quality and presence.

The hypothesis was confirmed. The effect of high school diploma percentages on web site quality and presence was both positively correlated and statistically significant. As the percentage of the population with a high school diploma increases, so does the overall quality and presence of Arkansas county government web sites. The results of this test can be seen in Tables1 and 2. Figure 6 shows a map of Arkansas counties by the percentage of the population with a high school diploma. Figure 7 is a scatter plot showing a direct relationship between web site quality and high school education. As the percentage of population with a high school diploma increases, web site quality trended upward.

Figure 6: Map of Arkansas Counties by Percentage of Population with a High School Diploma

Source: Arkansas County government web sites and 2010 U.S. Census data

Figure 7: Scatter Plot Comparing Arkansas County Government Overall Web Site Scores by the Percentage of the Population that has Obtained a High School Diploma

Source: Arkansas County government web sites and 2010 U.S. Census data

College Education

College education was chosen as a socioeconomic factor to see if the percentage of the population with a bachelor's degree or higher had an effect on overall county government web site quality and presence. The hypothesis was that as the percentage of the population with a bachelor's degree or higher increased, so would web site quality and presence.

The hypothesis was confirmed. The effect of college degree percentages on web site quality and presence was both positively correlated and statistically significant at 0.01 level. As the percentage of the population with a bachelor's degree or higher increases, so does the overall quality and presence of Arkansas county government web sites. The results of this test can be seen in Tables 1 and 2. Figure 8 shows a map of Arkansas counties by the percentage of the population with a bachelor's degree or higher. Figure 9 is a scatter plot showing a direct relationship between web site quality and college education. It shows that as the percentage of the population with a bachelor's degree or higher increases, so does web site quality.

Regional Effect

Congressional districts as a socioeconomic factor were tested to determine if there were any regional effects on Arkansas county government web site quality and presence. The hypothesis was that Congressional

Figure 8: Map of Arkansas Counties by Percentage of Population with a Bachelor's Degree or Higher
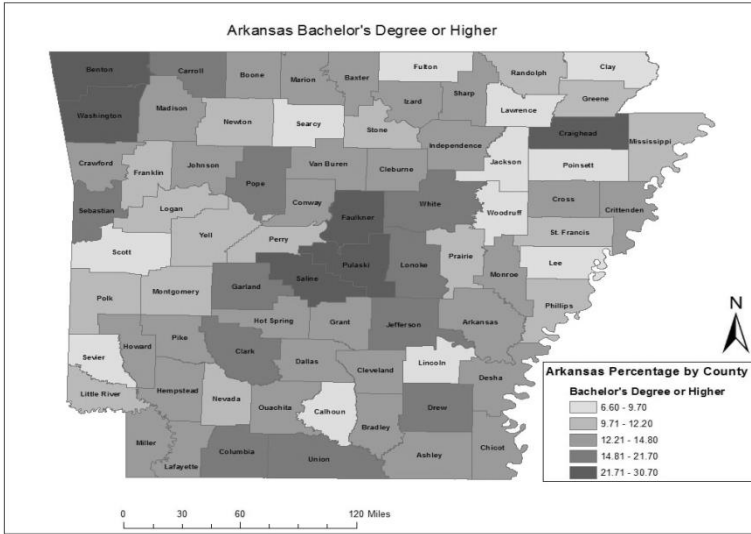
Source: Arkansas County government web sites and 2010 U.S. Census data

Figure 9: Scatter Plot Comparing Arkansas County Government Overall Web Site Scores by the Percentage of the Population that has Obtained a Bachelor's Degree or Higher
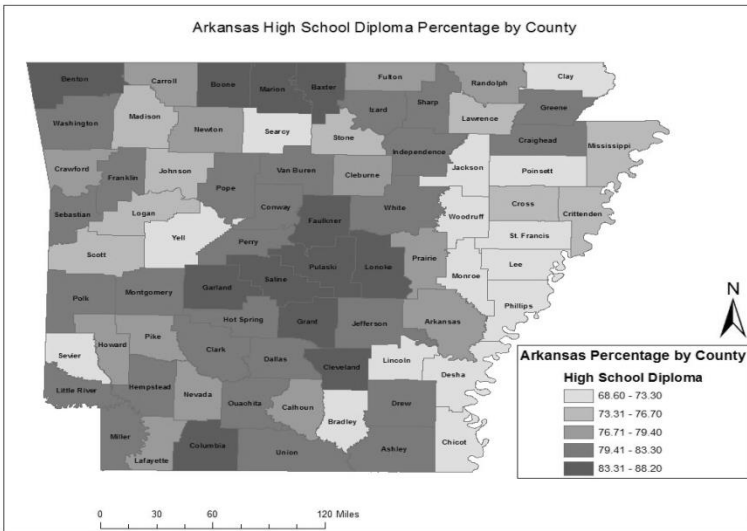

Source: Arkansas County government web sites and 2010 U.S. Census data

Districts 2 and 3 would experience better quality web sites and would be more likely to have web sites than Congressional Districts 1 and 4, which
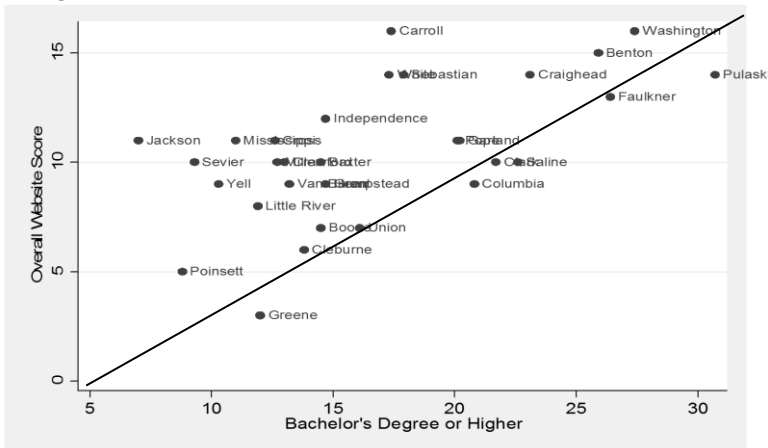
were expected to have poorer quality web sites and be less likely to have a web site (given the descriptions of these districts above).

The hypothesis was not confirmed. Congressional Districts 2 and 3 did not have a statistically significant impact on both web site quality and presence. District 2 showed a positively correlated and statistically significant impact on web site presence, but not on web site quality. District 3 showed a positively correlated and statistically significant impact on web site quality, but not on web site presence. Districts 1 and 4 did not have a statistically significant impact on both web site quality and presence. District 1 did not indicate any statistical significance on web site quality or presence. District 4 showed a negatively correlated and statistically significant impact on both web site quality and presence. The results of this test can be seen in Tables 1 and 2.

Race

Race was chosen as a socioeconomic factor to determine if there was a minority effect on the presence and quality of Arkansas county government web sites, with the hypothesis that as the percentage of a minority population in a county increased, the quality and presence of web sites would decrease.

The hypothesis was not confirmed. The data shows that race did not have a statistically significant negative impact on Arkansas county government web site quality or presence. The only racial factors that turned out to be significant were positively correlated, indicating that web site quality and presence increases with larger minority populations. However, by looking at the statistically significant impact of the Hispanic population on overall web site quality, one can see that these scores are impacted by outlier counties. Therefore, the impact of race on web site quality and presence was neutral. The results of this test can be seen in Table 3. Figure 10 shows a scatter plot showing the effect of outlier counties on statistical significance. The scatter plot indicates that most counties have a very small Hispanic population and that the counties that do have large Hispanic populations are those with larger populations. While the presence of a larger Hispanic population does seem to positively impact web site quality, the data is skewed by four major outlier counties.

Table 3: Effect of Race on Overall Web Site Quality and Presence of Arkansas Counties

	Overall Web Site Score	Presence of a Web Site
Black	0.000 (0.000)	0.000 (0.000) [1.000]
Native American	-0.000 (0.001)	0.001 (0.001) [1.001]
Asian	-0.001 (0.000)	-0.002 (0.001) [0.997]
Pacific Islander	-0.000 (0.000)	0.104** (0.044) [1.110]
Hispanic	0.000** (0.000)	0.000 (0.000) [1.000]
Constant	9.389*** (0.776)	-1.720*** (0.430) [0.179]
R^2	0.307	
Pseudo R^2		0.253
N	31	75
F-Statistic	42.600***	

*p<.10, **p<.05, ***p<.01.; robust standard errors are in parentheses based on a two-tailed test; odds ratio in brackets. Source: Arkansas county government web sites and the 2010 U.S. census.

Figure 10: Scatter Plot Showing the Outlier Counties Influencing Hispanic Impact on Significance Testing
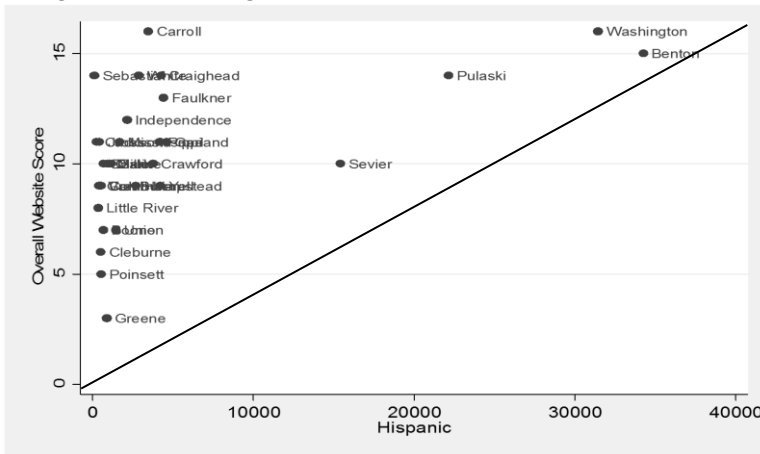
Source: Arkansas County government web sites and 2010 U.S. Census data

Summary and Conclusion

This study has sought to measure 75 Arkansas county web sites in terms of their accessibility, accountability, democratic participation and transparency, all seen as necessary components of e-government. It then used this evaluation to analyze whether certain socioeconomic factors have a significant impact on the quality and presence of Arkansas county government web sites, specifically population, age, high school education, college education, positioning in a Congressional district and race.

Arkansas county government web sites performed poorly in overall accessibility, which was measured in terms of compliance with W3C disability standards, Flesch-Kincaid readability statistics, and the availability of a Spanish-language option.

They scored low in two of the three accountability measures used to determine if each web site delivered traditional county services online. These were bill or fine payment online, and county road development.

In terms of democratic participation, which gauged whether county web sites promoted communication between government and citizens, as well as citizen participation in government, by making officials' contact information available (specifically email address and phone number of the county judge, county clerk, and sheriff), Arkansas county government web sites scored particularly high in the contact information measure. But they received a low score in providing voter information. While scholars such as Curtin, Sommer, and Vis-Sommer (2003) say citizens want to vote online, this option is not yet available in Arkansas. And it is doubtful it is available in any counties.

In a transparency measure to determine if citizens can get timely, online answers to their emails from county officials, whether they can search for what they want on county web sites, and whether county budgets and meeting information was available, Arkansas counties scored low in three out of the four measures: availability of a search bar, providing budgetary information and providing meeting information. However, overall they scored higher on email responsiveness. There was quite a range of scores from low to high.

When these factors were tested against socioeconomic factors to see if these had a significant influence on the web site scores or web site presence, four hypotheses were confirmed out of the 6 advanced. Socioeconomic factors that had a statistically significant impact on web site quality and presence were population, age (for those aged below 30, and particularly for ages 25 to 29), high school education, and college education. The regional effect of living in a specific congressional district did not correlate with having both a county web site presence and quality. And the presence of larger minority populations had a neutral effect on web site quality and presence.

This study contributes to the literature on e-government in that it offers additional, needed insight on county e-government development. Many other studies either have combined counties with cities (sometimes called municipalities), or do not focused on counties at all. It also contributes in that it links socioeconomic factors to the presence and quality of county web sites, including accessibility by the disabled, which has not been widely studied. Finally, it studies a bifurcated state that has some major players in it and yet still has extremes in terms of development. This provides some richness behind the data.

The limitations of the study are that it used only certain factors to measure quality. Additionally, even as this was written, the development of Arkansas county web sites was changing, so this study represents a snapshot in time. However, the author's students continue to study Arkansas county web sites on an annual basis, and in 2015 presented select findings to county officials. More academic sharing with officials needs to happen, and more officials need to see best and worst practices, and learn what users expect from county web sites. And scholars need to hear more from officials about the challenges they are facing and their beliefs about the value of e-government.

Further research is needed in this and many other areas of county e-government progress or lack of it. As Manorahan (2013) highlights, counties play an increasing role in regional economic development. Economic development is not solely linked to counties having web sites or having quality web sites, however. Developers, citizens and visitors may find a great deal of information on city and state web sites. But certainly given the important role that counties play, county associations should be emphasizing e-government as a priority and setting standards for good sites (the National Association of Counties at last check said little publicly about emphasizing e-government as a priority). And county web sites may provide the potential to help generate development to local economies. They also may affect governmental effectiveness and bureaucratic efficiency in ways that may in the long term encourage the private sector to invest in local communities. But both of these areas are the subject for another paper or papers.

Manorahan (2013) also recommends that states provide leadership, funding, support, and recognition of best practices for counties regarding e-government. He would find agreement here. The national government and states should also be playing an encouraging, guiding, and perhaps financial

role, while also setting levels of standardization, privacy and security. As Manorahan (2013) found, "counties with greater support from elected officials have more sophisticated e-information practices[,] since they can act as institutional catalysts capable of ensuring that government organizations continue to adopt new, innovative technologies that appeal directly to the public" (158). Manorahan (2013) also pointed out that counties seem to be less supportive of encouraging transactions and participation online.

Money may not always be the driving factor as to whether counties have sites, or have quality sites. Commitment and understanding are key. Counties must have information directors who manage and update the sites, and they should have substantial IT training. There should be protocols for communication with users, including via social media, another area the author and her students have examined in a cursory way, but which warrants further study. Williamson and Parolin (2013) confirm that local government's e-government communication is rarely monitored or analyzed. Manorahan (2013) also recommends providing more IT training to employees to increase stakeholder support of e-government.

Mixed in with these issues are increasing concerns regarding privacy and security of data. And these issues are affecting countries in profound ways. Counties may be even less sophisticated in their online practices than higher levels of government in this area. The author is aware of one county entity in Arkansas that lost approximately $30,000 to hackers. This represents taxpayer money. Users of sites must feel safe in using e-government at all levels of government. This also could have an effect on economic development.

Thus further study is also needed on the use of contractors to design sites and manage personal information, including how this affects control issues for counties. More study is also needed of other site quality indicators. More in-depth study could be done of any of the variables, including age, race, Congressional districts, etc., as they affect the results. And study is needed of accessibility and usefulness of sites for the disability community, the non-English-speaking communities, and the often older, less technology-savvy persons. Perhaps governments need to provide physical sites to help county residents navigate and use county web sites, as some governments do (the author has seen a Canadian federal location that does this).

More study also could be done on the enthusiasm levels by county officials for e-government and what encourages and prevents them from

committing to it, as well as their sophistication with what is wanted by citizens and the actual costs of set-up and proper site maintenance, including updating and fixing broken links. Study could also be done on the IT training, if any, provided to county officials involved in their web sites' presence and quality and whether there are designated monitors of county sites.

This study builds on some nascent research on county e-government. While some Arkansas counties appear to be making progress in e-government and should serve as an example to others, many Arkansas counties have a long way to go in their progress toward providing a quality web presence that meets users' many needs. At the time of the study, less than half of Arkansas counties even had a county web site, and most were lacking in the areas of accessibility, accountability, democratic participation and transparency as measured here. The fact that an official-looking Arkansas county web site was created by a private individual (complete with his political agenda) in the absence of an official site indicates a need for official creation and monitoring of quality county web sites. The literature certainly points to a desire by populations for more and better e-government, which also requires better connectivity, which in turn may require more equity in quality of life.

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