CURRENT USES OF 2.0 APPLICATIONS IN TRANSPORTATION

Case Studies of Select State Departments of Transportation

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REPORT NOTES AND ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

"Web 2.0" is an umbrella term for websites or online applications that are user-driven and emphasize collaboration and user interactivity. The trend away from static web pages to a more user-driven Internet model has also occurred in the public sector, where these dynamic web pages are known as "government 2.0" applications. The goals of government 2.0 applications are to promote transparent governance and citizen involvement in decision-making, often through sharing government data online through web-based applications. Overall, web applications termed 2.0 are distinguished from earlier generation online resources because they emphasize:

- Users' participation in content creation, editing, or distribution.

- The ability to provide customized information to users that is tailored to their specific interests, preferences, or requests.

In this report, the term "2.0" is used to refer to both web 2.0 and government 2.0 applications, since both types of initiatives share similar functionalities, albeit government 2.0 websites focus specifically on user participation in a government context.

This report presents and synthesizes the findings from seven case studies that assess how select state Departments of Transportation (DOTs) are applying 2.0 tools to meet various business objectives. The report identifies best practices, benefits, challenges, and lessons learned in the use of these technologies. It also describes the participating transportation agencies' decision-making processes regarding the implementation and management of 2.0 applications. Observations made in the case studies are expected to support transportation officials in their efforts to consider the pros and cons of 2.0 use, as well as to determine how 2.0 tools might be best utilized. The project team case prepared case studies for DOTs in Massachusetts (MassDOT), Mississippi (MDOT), Missouri (MoDOT), North Carolina (NCDOT), Rhode Island (RIDOT), Texas (TxDOT), and Washington (WSDOT).

Key Findings
Key findings from the case studies include:

- ***Many types of 2.0 tools can be effective for transportation agencies.*** State DOTs are using a wide array of 2.0 tools, including wikis, social media (e.g., Facebook), podcasts, blogs, micro-blogging services (e.g., Twitter), and shared documents (e.g., Google documents, Sharepoint). The variety of technologies being used suggests that many different types of tools can support transportation agencies' business missions. In most cases, agencies were using multiple tools concurrently to achieve similar objectives, indicating that the tools are not mutually exclusive and can be combined as a suite.

- ***State DOTs are using 2.0 tools for many different purposes but primarily to provide information to the public in newer ways than in the past***. The most common use of 2.0 tools at interviewed state DOTs was to provide information and data to the public in newer ways than in the past. For example, state DOTs using traditional media have typically needed to work with an intermediary (e.g., a press outlet or newspaper reporter) to pass information to an external audience. Newer 2.0 technologies have enabled agencies to directly communicate with the public without the need for a liaison and on a more frequent basis.

  State DOTs are also using 2.0 applications to:
  - Provide more in-depth or customized information to broader audiences and new audiences, especially younger people;
  - Support new forms of public involvement, such as obtaining public feedback and responding to public questions or concerns;
  - Encourage a collaborative approach to reaching solutions to transportation issues;

- o Allow multiple users to concurrently view, create, and edit web-based content; and
- o Streamline internal agency communications.

- ***The benefits of 2.0 tools outweigh the challenges.*** As with any new technology, agencies should carefully consider each type of tool available to assess whether it is appropriate to accomplish its intended objectives. In general, however, the state DOTs interviewed believed that benefits derived from use of the 2.0 tools greatly outweigh any anticipated or experienced difficulties. These benefits include the realization of time and cost savings through more efficient resource allocation and reduced inquiries from the media and stakeholders, as well as the ability to support new forms of public involvement. Overall, 2.0 tools can be effective, innovative mechanisms to support agencies in addressing customers' needs and furthering business missions.

- ***More work is needed to develop measures to assess the effectiveness of applications***. State DOTs are using some metrics and anecdotal evidence to evaluate use of 2.0 tools, including quantitative metrics such as the number of site "followers" or "fans." However, metrics that evaluate whether the tools are meeting users' needs are not yet common and anecdotal evidence is commonly being used for this purpose. This could be due to the fact that the tools are still relatively new and the state DOTs have not yet collected sufficient data for comprehensive evaluation. Use of qualitative metrics, such as the quality of public interaction the site supported, might help offer a better understanding of the sites' effectiveness. As agencies collect more data on the tools, it is expected that they will be able to develop more robust performance measures.

- ***There is a need to develop clear guidelines for public use of 2.0 tools***. Transportation agencies face a unique challenge in implementing 2.0 tools due to the potential for distracted driving, particularly with respect to those tools focused on providing travel information to the public and accessed via mobile devices. Although emerging technologies, such as vehicle dashboard displays, might alleviate this challenge, transportation agencies using 2.0 technologies will likely need to develop clear guidelines and recommendations for when and how it believes the public should use these tools.

- ***Use of 2.0 tools will continue and increase in the future***. It is likely that more agencies will be using 2.0 technologies in the future to achieve numerous objectives. There is a trend towards agencies providing highly customized information to the public in real-time. Additionally, some state DOTs noted a trend toward using 2.0 to specifically engage the public via virtual meetings. This could range from posting public outreach videos online to streaming live public meeting broadcasts, complete with chat features that allow input.

In summary, state DOTs are using a wide variety of 2.0 tools to accomplish numerous goals, including to provide information to new and broader audiences, streamline internal communication and efficiencies, build communities of interest around transportation, and support collaborative content creation and problem-solving. Agencies generally believed that the use of 2.0 applications provided time and cost savings through more efficient resource allocation and reduced inquiries from the media and stakeholders. Overall, these tools can help agencies more effectively address customers' needs and further business missions.

INTRODUCTION

Purpose

This report summarizes the results of a study conducted to understand how state Departments of Transportation (DOTs) are using 2.0 technologies to meet various business objectives. The practices, challenges, and lessons learned in this study are expected to help others in the transportation industry identify and evaluate approaches to implementing, managing, and maintaining 2.0 applications.

Background

"Web 2.0" is an umbrella term for websites and online applications that are user-driven and emphasize collaboration and user interactivity. The term was created by a media company in 2004 to describe the next generation of websites that regularly incorporated user interactivity in creating content, differing from previous websites that provided only static content or provided limited opportunities for user interaction.[1] Applications termed "2.0" began to emerge after the development of broadband internet and other computer technologies, which eliminated many of the delays previously experienced when accessing websites. These technologies made it easier for users to interact with websites, converse with other site users, and add or edit content without the need to use a coding language.

In the public sector, dynamic web pages that support user-driven content are now known as "government 2.0" applications.[2] Government 2.0 applications are a sub-set of web 2.0 tools that specifically promote user interactivity and collaboration in a government context. Typically, the goals of government 2.0 applications include supporting more transparent governance, citizen involvement in government decision-making, or making internal government agency communication more efficient.[3]

The development of 2.0 applications in a government context is a recent trend that has been institutionalized in Federal policy and guidance. In December 2009, for example, the Federal Office of Management and Budget issued a directive to promote a culture of open government, requiring Federal executive agencies to publish high-value data sets for public consumption on websites that allow public feedback and input.[4] A January 2009 Presidential Memorandum,[5] later clarified in an OMB directive,[6] states that government should be transparent, participatory, and collaborative. The White House 2009 Memorandum on Transparency and Open Government[7] also underscored the Federal government's commitment to use 2.0 tools as a means to support public involvement and citizen engagement.

The institutionalization of 2.0 forums in Federal directives has led to these types of applications being prevalent at the Federal level. Examples of 2.0 tools in Federal government include the U.S. Secretary of Transportation's blog (*FastLane*)[8] and the USDOT online Citizen Engagement Tool,[9] which encourages the public to submit and rate ideas on how the USDOT can improve the quality of USDOT information, work with the public, collaborate with other agencies, and be more efficient.[10] These applications

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[1] David Wyld. The Blogging Revolution: Government in the Age of Web 2.0. IMB Center for the Business of Government. 2007. Available at www.businessofgovernment.org/pdfs/WyldReportBlog.pdf

[2] To avoid overly technical distinctions between web and government 2.0 applications, the general term "2.0 tools" is used throughout this report to describe state DOTs' use of web-based applications that focus on user interactivity.

[3] www.esri.com/news/arcuser/1009/geoweb20.html

[4] OMB Directive: www.whitehouse.gov/omb/assets/memoranda_2010/m10-06.pdf

[5] Transparency and Open Government Directive from President Obama, 2009. www.whitehouse.gov/the_press_office/TransparencyandOpenGovernment/

[6] Open Government Directive: www.whitehouse.gov/omb/assets/memoranda_2010/m10-06.pdf

[7] Memorandum on Transparency and Open Government: www.whitehouse.gov/the_press_office/TransparencyandOpenGovernment/

[8] fastlane.dot.gov

[9] Available at opendot.ideascale.com/

[10] A compilation of U.S. government blogs is available at www.usa.gov/Topics/Reference_Shelf/News/blog.shtml

demonstrate 2.0 principles in providing forums through which government agencies can seek and respond to citizen feedback and provide government data more freely and frequently to users.

An increasing number of state DOTs are using 2.0 tools, particularly to reach constituents. The Transportation Research Board (TRB) Committee on Public Involvement, in fact, found that over half of all state DOTs are using some type of 2.0 application.[11] In a recently completed survey of state DOTs, the American Association of State Highway and Transportation Officials (AASHTO) found that many state DOTs are specifically using social media tools to reach the public; for example, approximately 81 percent of survey respondents reported using Twitter for this purpose.[12]

2.0 Tool Functionalities

Many different types of 2.0 applications exist, including blogs, wikis, podcasts, social media, mashups, and photo- or video-sharing sites. Some 2.0 tools are used primarily for one purpose. In general, however, 2.0 tools are flexible and the lines between 2.0 applications and their functionalities are often blurred. An agency might chose to use a 2.0 tool for one reason but then find that the application in fact serves several different purposes.[13] For example, WSDOT developed a blog called *The Big November Storm – How Did We Do?[14]* The initial purpose of the blog was to help WSDOT obtain public feedback on the agency's response to a major storm event. Based on the blog's success as measured by the number of public comments received, WSDOT broadened the blog to focus on more general public communication, such as sharing information on agency activities and news. Use of 2.0 tools can thus evolve over time. As a result, it can be challenging to categorize these tools in static categories.

Nevertheless, it is useful to develop a general framework to organize the array of tools and their primary functions. A transportation consulting company based in Vienna, Austria, developed four categories to describe the major functionalities of 2.0 applications, which are used throughout this report.[15][16] The four categories are described below and include brief examples:

- ***Information Provision.*** Applications used for information provision focus on serving information to users who have chosen to be recipients. An example of a 2.0 application used primarily for information provision is *FastLane*, the USDOT Secretary's blog. The primary purpose of *FastLane* is to provide transportation news, updates, and articles to users who choose to access the blog.

- ***Planning and Administration.*** Applications used for planning and administration focus on offering ways for multiple users to concurrently view, create, and edit content, or receive and provide feedback in an interactive environment. The Livable Streets Initiative's StreetsWiki and StreetsBlog are examples of 2.0 tools focused on planning and administration.[17] StreetsWiki provides a forum for the public to create articles on a wide variety of transportation and public space topics, such as urban bicycling for children. StreetsBlog allows users to add and update content, comment on articles, and receive feedback from other readers.

- ***Social Networking.*** Applications used for social networking purposes—social media tools— focus on creating and expanding social networks, developing virtual 'communities of interest'

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[11] TRB Committee on Public Involvement. Social Media/Electronic Participation: The Changing Face of Communications and Public Involvement in Transportation. January 10, 2010. Available at www.trbpi.com/events/SocialMediaWorkshop_2010.pdf

[12] Thirty-two state DOTs responded to the survey. From an AASHTO communications brief: State Departments of Transportation Lead the Way in Using New Media (February 2010). Available at http://www.transportation.org/sites/publicaffairs/docs/New_Media_Research_Brief.pdf

[13] For a general guide to use of social media applications for public transportation agencies, see Routes to New Networks. National Center for Transit Research. November 2009. Available at www.gosocialtransit.com/routes_to_new_networks.pdf

[14] Available at wsdotblog.blogspot.com/2006/11/big-november-storm-how-did-we-do.html

[15] The table is adapted from the one included in a November 2009 paper by Andy Nash at Vienna Transport Strategies. See www.andynash.com/nash-publications/2009-Nash-Web2forPT-14nov09.pdf

[16] When available, a transportation-specific example for each tool is provided in Table 1.

[17] StreetsWiki available at www.livablestreets.com/streetswiki . StreetsBlog available at www.streetsblog.org/

focused on a particular topic or issue, and enabling dialogue between and within networks. An example of a social media tool is the MassDOT developers' Facebook page.[18] The page, which is publicly accessible but tailored to software developers working with MassDOT data, enables users to share information about MassDOT news and data, converse with others belonging to the Facebook group, and identify others sharing interests in related topics.

- ***Analysis and Evaluation***. Analysis and evaluation applications focus on enabling users to use web-based tools to collaboratively provide, analyze, and share data to reach solutions to specific transportation issues or problems. Next Stop Design is an example of an analysis and evaluation 2.0 application.[19] The website was developed as part of a research project sponsored by the University of Utah, the Utah Transit Authority, and the Federal Transit Administration. Users accessing Next Stop Design were encouraged to submit design ideas online for a better bus stop that took safety, environmental, and other factors into consideration. Users could view others' submissions, provide and obtain feedback on designs, and submit pictures of existing bus stops.

At a basic level, all 2.0 applications focus on sharing information with audiences in different ways than in the past, but these applications have the capacity to serve broader purposes. Table 1 provides a more detailed overview of specific types of 2.0 tools and their primary functionalities in a transportation context.

Research Approach

Based on a brief literature review and an internet scan of government 2.0 applications, the project team identified a number of state DOTs that have developed extensive or innovative uses of 2.0 tools.[20] Seven of these state DOTs were selected to study in more depth based on their geographic distribution (a greater geographic range was preferred) and the ways in which agencies were using 2.0 tools to meet business objectives (a greater breadth of use was preferred).

To conduct the case studies, telephone discussions ranging from 30 to 60 minutes were held with state DOT representatives who identified themselves as appropriate contacts. The project team tailored a flexible discussion guide to structure the interview conversations while allowing participants to talk about additional topics of interest to them. While an effort was made to discuss a wide range of topics, it is possible that the interviews did not capture all 2.0 applications in a state DOT since the staff member participating in the call might not be familiar with every application in use.

The team then compiled information from the discussions, relevant supplemental materials, and comments and suggestions made by the interview participants to develop case studies for the DOTs in Massachusetts (MassDOT), Mississippi (MDOT), Missouri (MoDOT), North Carolina (NCDOT), Rhode Island (RIDOT), Texas (TxDOT), and Washington (WSDOT) (see page 20 for complete cases).

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[18] Available at www.facebook.com/pages/MassDOT-Developers
[19] Available at www.first.nextstopdesign.com
[20] Results from the scan, which represent a snapshot of efforts rather than a comprehensive review, are included in Appendix A.

Table 1. Overview of 2.0 Tools by Main Function and Overall Category[21]

2.0 Tool	Main Function(s)	Functionality Category			
		Information Provision	Planning and Administration	Social Networking	Analysis and Evaluation
Wikis (e.g., Wikipedia)	Streamline review and editing of documents; provide interactive forums to assist agency processes.	X	X		
Social media tools (e.g., Facebook, MySpace)	Share relevant information with the public or with internal agency groups; encourage discussion with users; promote agency mission and projects; allow users to create interest groups and develop and maintain social networks.	X		X	
Mashups (e.g., Bikewise)	Provide visual representations of transportation projects or travel updates customized to a users' location; allow users to submit comments on geographically specific issues (e.g., a broken streetlight).	X			X
Podcasts (e.g., White House podcasts)	Provide information to the public on selected or specific topics.	X			
Media-sharing sites (e.g., YouTube, Flickr, Slideshare)	Post videos or pictures highlighting transportation projects or agency events; post slideshows.	X		X	
Really simply syndication (RSS) feeds	Allows users to know when website updates occur.	X			
Blogs (e.g., *FastLane*, the USDOT blog)	Provide general information to the public; support dialogue by allowing agency responses to public comments; allow agencies to follow others' news.	X		X	
Micro-blogging services (e.g., Twitter)	Share general agency and transportation information with the public; monitor public references to the agency; expand audiences for transportation information by reposting others' posts.	X		X	
Interactive surveys (e.g., Cyclopath)	Enable users to receive customized information based on preferences		X		
Shared documents (e.g., Google documents)	Post and share documents with specific stakeholder groups; allow group users to edit and create content.	X	X	X	X

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[21] Appendix C provides the web links for all examples included in Table 1 as well as additional examples.

2.0 Tool	Main Function(s)	Functionality Category			
		Information Provision	Planning and Administration	Social Networking	Analysis and Evaluation
Virtual meetings, meeting-sharing tools (e.g., Slideshare)	Provide information on meetings and meeting materials; allow participants to interact with meeting hosts and speakers via chat or other features.	X	X		
Professional networking sites (e.g., LinkedIn)	Allow users to share information regarding professional affiliations and network with other professionals.	X		X	
Virtual worlds (e.g., Second Life)	Provides simulated environments where users can interact, share information, and build networks with others.			X	
Bookmarking sites (e.g., Digg.com, delicious.com)	Allows users to share information about websites and access web bookmarks from a centralized location.			X	
Cloud-based computing[22] (e.g., Google documents/groups)	Enable users to use web-based tools to collaboratively enter, analyze, share data, and reach solutions.	X	X		X
Crowd sourcing (e.g., Next Stop Design)	Allows multiple users to collaboratively develop solutions to specific issues, make recommendations, or develop tools.		X		X
Simulation games (e.g., Mobility)	Provides simulated environments where users interact with game components or with other users; primarily used as educational tools.				X

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[22] Cloud-based computing refers to websites that enable users to use a web-browser, rather than a desktop, to store, analyze, and share data with others.

FINDINGS

Interviews with case study agencies led to a number of findings in several areas, including uses of 2.0 tools, associated benefits and challenges, and lessons learned encountered during the implementation, management, and assessment of the tools. These findings are described below.

Uses of 2.0 Tools

The interviewed agencies are using 2.0 tools for all of the purposes described in the previous section, including information provision, planning and administration, social networking, and analysis and evaluation (see Table 2).

Table 2. Overview of State DOTs, Current 2.0 Tools, and Primary Functionalities

Agency	Application	2.0 Functionality Category			
		Information Provision	Planning and Administration	Social Networking	Analysis and Evaluation
MassDOT	Twitter (both a general agency Twitter page and a Twitter page tailored to data developers)	X		X	X[23]
	Blog	X		X	
	YouTube	X		X	
	Mashup maps	X			X
	Slideshare	X			
	Flickr	X			
	RSS feed	X			
	Data developers' Google documents and Google groups		X		X
	Data developers' Facebook page			X	
MDOT	Twitter route-specific hurricane evacuation guides	X			
MoDOT	Blog	X			
	Twitter	X		X	
	YouTube	X	X		
	Podcasts	X			
	Facebook	X		X	
	RSS feeds	X			
	Wikis (Engineering Policy Guide wiki and next generation desktop wiki)		X		
	Digg account			X	
	Flickr	X		X	
	Mashups (i.e., Traveler Information Map)	X			
NCDOT	Facebook	X		X	
	Twitter (including region-specific Twitter sites)	X		X	
	Flickr	X		X	

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[23] Primarily the developers' Twitter page.

Agency	Tool				
	YouTube	X		X	
	Mashups	X			
	Microsoft Sharepoint sites		X		
RIDOT	Iway documentary podcasts	X			
	Facebook	X		X	
	MySpace	X		X	
	Blog	X			
	Twitter	X			
TxDOT	Facebook	X		X	
	Twitter (including 25 District Office Twitter pages)	X		X	
	YouTube	X			
	Podcasts	X			
WSDOT	Blog	X			X
	YouTube	X			
	Facebook	X		X	
	Twitter	X		X	
	Slideshare	X			
	Flickr	X			
	Microsoft Sharepoint sites		X		

Information provision was the most common use of 2.0 tools across the state DOTs in this study. As a whole, agencies are using 2.0 tools to enable more efficient and direct communication with the public on transportation issues, concerns, and points of praise. The most frequently used tools for information provision were blogs and social media applications such as Twitter or Facebook. The prevalence of social media applications in the information provision category is notable and suggests the flexibility of these types of tools to communicate information in addition to supporting group networking.

Data being provided via information provision-focused tools included agency news, details on agency events, as well as real-time information on travel conditions, road closures, evacuation routes, transportation projects, transit schedules, and updates on weather-related events affecting roadways. Examples of information provision tools and the types of data provided include:

- RIDOT's series of six podcasts, which provided details on the Iway, a complex, multi-year highway project in Providence.

- WSDOT's YouTube and Facebook pages, which provide information on emergency events, travel conditions, and details of transportation projects.

- NCDOT's region-specific Twitter feeds and Twitter account tailored to ferry customers, which provide traffic and travel conditions updates to subscribers.

Most state DOTs were also using 2.0 tools for social networking purposes and to help build communities of interest around transportation issues. Only one agency (MDOT) noted that it was not currently using tools for social networking. Agencies were also commonly using social media tools to promote positive public relations and increase agency accessibility to the public. For example:

- MassDOT posted YouTube videos of the Massachusetts' Secretary of Transportation's speeches, believing that this helped customers see the 'personal face' of the agency and increase their interest in the agency's activities.

- RIDOT implemented an array of social media tools, such as Facebook and MySpace, as part of a general public relations strategy to encourage awareness of RIDOT projects and increase public access to travel condition information.

Use of 2.0 tools for planning and administration functions was slightly less common, with four agencies (MassDOT, MoDOT, NCDOT, and WSDOT) reporting use of 2.0 tools for this purpose. The specific tools being used for these objectives included mashups, wikis, Sharepoint sites, Google groups, and Google documents. Several examples are listed below:

- MoDOT implemented a wiki to update its Engineering Policy Guide (EPG), streamlining the often cumbersome task of reviewing and tracking edits from multiple users located around the state. MoDOT's new comfort level with wikis subsequently enabled it to adapt this technology for other purposes; the agency is now using a wiki for information technology (IT) staff to compare notes and tips during a recent agency-wide software upgrade.

- MassDOT uses Google documents and groups to collaborate with third-party data developers; the shared documents have enabled data developers to discuss ideas related to use of MassDOT data to build transportation applications and visualization tools.

- Some WSDOT staff and NCDOT Divisions use Microsoft Sharepoint sites to facilitate communication among internal project teams or share documents, images, and other information among staff.

Several agencies also reported plans to explore future uses of 2.0 tools for planning and administration. For example, NCDOT anticipates launching a wiki in 2010 to enable IT staff to track and view all IT questions and requests from a centralized location.

Use of tools for analysis and evaluation was infrequent, appearing in only two agencies (MassDOT and WSDOT). WSDOT's blog was initially designed to capture public feedback and suggestions on how to improve agency performance. MassDOT maintains a mashup map that allows users to post comments regarding neighborhood-specific transportation issues, such as overcrowded bus routes, broken stoplights, or potholes. Mashup users can place 'flags' to pinpoint the locations of their concerns on a Google map. MassDOT staff can then access the mashup to respond to comments. It is possible that few state DOTs have explored using 2.0 tools for analysis and evaluation due to broader concerns regarding privacy or management issues that might be encountered when using web-based applications to store data.

It is apparent that agencies are also using or anticipating use of 2.0 tools for additional purposes not included in the four overarching categories. For example, NCDOT is exploring use of 2.0 applications to communicate with contractors and streamline invoicing. These functionalities are best defined as support of internal operations and do not fit neatly into the existing categories. Furthermore, many agencies commonly reported that 2.0 presents significant opportunities for facilitating creative public involvement, another functionality not fully captured in the existing categories. Agencies are using 2.0 applications to support public involvement in many ways. For example:

- TxDOT identified social media tools as mechanisms to support more meaningful public involvement after an internal assessment suggested that the agency needed to do more to engage the public.

- NCDOT, RIDOT, and WSDOT are considering or exploring tools that enable remote participation in public meetings or allow live broadcasts of meetings.

- NCDOT posts videos of budgeting and stimulus spending meetings on YouTube.

The frequency with which 2.0 applications were used (or were being planned) for civic engagement indicates that public involvement should be added as fifth category of 2.0 tool functionality. These examples also indicate that the tools can support distinct components of public involvement, such as engaging citizens in decision-making processes, responding to public comments and concerns, or making agency functions more transparent. The willingness of state DOTs to engage the public in active

dialogue, offering information in open forums that was not previously publicly available, is indicative of the movement towards government 2.0—a trend supported at the highest levels of government.

Major Benefits

State DOTs noted many benefits of 2.0 tool use. These benefits fall into several broad categories, including improved interaction with the public, enhanced public accessibility of transportation data, and streamlined internal communications.[24] More specifically, agencies reported that 2.0 tools:

- ***Increase venues to reach more people and new audiences.*** Several state DOT staff members stated that 2.0 tools (particularly social media) allowed their agencies to communicate with new audiences—especially younger people—who might not have typically received transportation news via traditional outlets (e.g., newspapers or press releases). Agencies also believed that 2.0 tools provided a new venue for communicating with more people than previously reached. For example, some state DOTs reported that a number of media outlets have become fans and followers of agencies' 2.0 applications. A post or tweet can frequently develop into a story the media chooses to widely cover, increasing the venues for people to obtain transportation news. It was further noted that some 2.0 tools (e.g., RSS feeds) have the potential to induce more traffic to agencies' traditional websites.

- ***Allow more direct communication with the public.*** Historically, agencies using traditional media, such as a newspaper article or press release, have required an intermediary (e.g., a press outlet or newspaper reporter) to pass information to an external audience. Newer 2.0 technologies can enable more direct public communication. An agency can use a 2.0 tool to provide information to the public without the need for an intermediary to produce and distribute information on the agency's behalf. For example, an agency wishing to update the public on roadway conditions could write a blog entry on this subject and immediately post the entry online.

- ***Support new forms of public involvement.*** As previously noted, agencies frequently reported the use of 2.0 tools to support citizen engagement in decision-making and other forms of public involvement. The 2.0 tools can increase an agency's ability to proactively solicit, receive, and respond to public comments on a more frequent basis. Newer 2.0 technologies are expanding opportunities for agencies to respond to feedback and for the public to provide feedback when and where they would like, as 2.0 applications are usually available on a 24-hour basis, are easily accessed from many locations via the internet, and are typically free for users. Many of the state DOTs interviewed reported that public users appreciate their voices being heard, even if the agency is not able to always respond to specific questions or concerns.

- ***Provide in-depth information to audiences.*** Many 2.0 tools can provide highly detailed, specific information to an audience. For example, MoDOT's EPG wiki is a comprehensive reference document that combined information previously contained in six separate manuals. RIDOT's Iway podcasts each focused on providing detailed information to the public about a specific component of the Iway, the most complex and expensive highway project undertaken by RIDOT. The podcasts included maps, historical images, video, and still footage shot throughout project construction. However, it is important to note that only specific types of 2.0 tools are conducive for providing in-depth information. For example, Twitter's tweets have a 140-character limit, making it difficult for an agency to use Twitter for lengthy posts.

- ***Deliver customized information to a target audience.*** Several agencies reported using 2.0 tools, particularly Twitter, to customize information and provide data to target audiences, such as customers interested in learning more about a particular roadway, region, transportation mode, or topic area. For example, MDOT disseminates its Hurricane Evacuation Guide via six route-

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[24] Andy Nash. Vienna Transport Strategies. November 2009. www.andynash.com/nash-publications/2009-Nash-Web2forPT-14nov09.pdf

specific Twitter feeds. Subscribers can choose the route that they would be likely to use in an evacuation event and receive updates tailored to this specific roadway. TxDOT's 25 District Offices each maintain a Twitter account that provides region-specific information.

Tailoring information means that the public can more easily view or receive the information that they view as important, timely, or interesting. Users can also choose when they would like to receive information by subscribing to feeds providing notification of webpage updates. This type of on-demand information can help ensure that customers receive the information they want rather than expecting that customers continually revisit a static webpage to obtain updates on a specific topic area.

- ***Enable agencies to develop a recognizable 'voice' in communicating with the public, increasing public recognition and perceived agency accessibility.*** In supporting more direct communication with the public, the use of 2.0 tools enabled agencies to develop a consistent 'voice.' This voice allowed some agencies to act as their own advocates to increase positive public perception of activities. In addition to posting YouTube videos of the Massachusetts' Secretary of Transportation's speeches, MassDOT also encourages the Secretary to use his initials to identify the tweets that he posts on the MassDOT Twitter page. The agency believes that this helps "personalize" the agency to the public, encouraging the public to view MassDOT in less bureaucratic terms and making it more recognizable and accessible to a broader audience.

- ***Lead to creative solutions using a collaborative approach.*** MassDOT and WSDOT reported benefits in using 2.0 tools to solicit and obtain public feedback on specific transportation issues. WSDOT noted that receiving public comments on its November storm blog helped the agency better analyze its actions and performance. MassDOT focused on data-sharing to encourage a collaborative approach to problem-solving. For example, MassDOT makes transportation data available on its developers' beta page[25] and uses a variety of 2.0 tools (e.g., Facebook, Google groups) to encourage conversations among data developers. The agency believed that this collaboration has led to new ideas about how MassDOT could make data more accessible and understandable to the public.[26] This 'wisdom of crowds' approach has also allowed MassDOT to focus its resources on core business missions while still encouraging new technologies to better serve the public. Use of 2.0 tools to collaboratively reach solutions—and the associated benefits—are likely to become more frequent as agencies become more comfortable with 2.0 applications, explore new tool functionalities, and develop internal policies that support public data-sharing.

- ***Increase efficiencies and streamline interagency communications.*** Overall, the tools provided time and cost savings by allowing agencies to proactively respond to anticipated and actual questions in a publicly accessible forum, thereby limiting the number of inquiries received and time spent responding to individuals. Several state DOTs also used 2.0 forums to communicate with colleagues and others inside and outside the agency, creating new internal work efficiencies. For example, a participant in a social media session at the 2010 TRB Annual Meeting provided an anecdote of an MPO staff member who used Twitter during a staff meeting. The individual tweeted a question about the status of a pending policy issue affecting the meeting agenda and received a response to the tweet within several minutes. The response included a link to the updated policy document, which had been posted online only the day before.

- ***Are flexible in the amount of time or resources needed to update them.*** Most agencies found that implementation and maintenance of 2.0 sites did not necessarily require significant time or resource investment, although there was some variability depending on the tools' intended purpose and type of tool being used. Indeed, only one agency (NCDOT) reported hiring additional

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[25] The beta page is available at http://www.eot.state.ma.us/developers/
[26] For examples of some transportation applications developed by third-parties with access to MassDOT transportation data, see http://www.massdotdevelopersconference09.com/applications

staff to manage 2.0 applications; all other state DOTs folded responsibilities for the tools into existing staff workloads. However, agencies generally found that it was important to focus some amount of sustained effort to keep the sites current and up-to-date; users do not want to read stale information. As a whole, 2.0 tools offer agencies flexibility to decide how much time and resources they would like to direct toward implementation and management.

Challenges

Several state DOTs interviewed reported challenges in implementing or operating 2.0 applications, particularly in terms of resource investments and the need to develop more comprehensive performance measures to evaluate tool uses and benefits. These challenges are discussed in more detail:

- ***Depending on their intended purpose, some 2.0 tools might require additional staff, technical, or fiscal resources.*** As mentioned, 2.0 tools offer agencies flexibility to decide on how much time and resources to expend. However, some tools often require more resources than others. Applications requiring frequent manual updating involve more staff time than applications that require less frequent posts. Some agencies set up automated feeds that avoided the need for manual updating, but this could also involve technical or other challenges. For example, MassDOT is currently adding automated public broadcast capabilities to its transit authority's bus data system. The agency has experienced some challenges in determining how to best retrofit the legacy system; the process will also require additional investment.

  Mashups often involve more technical challenges than other types of tools since mashups combine data from a variety of sources, some of which the agency might not control. For example, MoDOT reported difficulty in updating the Google base map used for its Traveler Information Map mashup. On the other hand, while mashups could require more upfront time investment, these applications could still yield significant cost and time savings in the long term as they reduce the load on agency servers (e.g., through use of a third-party base map) or allow users to more easily access information in a centralized location.

- ***Some 2.0 sites require staff time upfront or continued efforts to respond to public comments.*** Some state DOTs indicated challenges in finding time to initially implement the sites and familiarize other staff with their use. Afterwards, 2.0 applications generally require sustained staff time to keep information current or respond to comments. For example, TxDOT estimates that three employees each devote two hours per week to update its social media sites and that additional staff are sometimes needed to develop user policies, resolve technical issues, and communicate new developments. Several agencies anticipated or experienced challenges with the amount of time that would be required to respond to comments and made a concerted effort to limit expenditures of staff time in this area. NCDOT, for instance, disabled the public comment mechanisms on its 2.0 applications due to limited staff availability to respond to comments.

- ***It can be difficult to develop comprehensive performance measures that assess the value and usefulness of 2.0 tools.*** Most of the state DOTs mentioned that they track easily quantified indicators like number of fans, followers, views, or comments received, in order to assess the value of 2.0 tools. TxDOT measures the number of times its tweets are re-tweeted. Other agencies measure increased web traffic or the amount of positive public comments received on social media sites. MDOT plans to measure the reduction in calls to its emergency call centers once its hurricane evacuation Twitter feeds are fully activated. NCDOT informally assessed the reduction in questions about project schedules after implementation of 2.0 tools, believing that this reduction was due to increased traffic to the sites and the effectiveness of the sites in providing useful information.

  Agencies using quantifiable indicators found that these indicators could sometimes be misleading or else provide a limited picture of how the sites were being used. For example, many 2.0 sites can be accessed without the need to become a follower or fan; follower/fan numbers can therefore misrepresent the number of people who are actually using the tool. Without

comprehensive metrics, some staff noted the need for caution in assuming that the tools were serving the public's needs.

To provide a more comprehensive picture of 2.0 site benefits, some agencies have developed qualitative measures in addition to more quantitative metrics. For example, TxDOT tracks the volume of "quality conversations," the frequency with which the agency uses a social network site to engage in active dialogue with a member of the public. While these and related metrics are useful indicators by which success might be gauged, it does not appear that the interviewed state DOTs have, as of yet, found a way to fully evaluate these initiatives' effectiveness. As 2.0 applications mature, it is expected that state DOTs will develop more robust ways of measuring their utility.

- ***Agencies might experience less control over how information is presented.*** As the popularity of 2.0 tools increases, agencies have found that more people are distributing information found on the sites via other forums (e.g., through retweets or posts on other websites). While these reposts can help the agency provide transportation news and data to larger audiences or to new audiences, the result is that agencies have less control over how information is being presented and the context in which it is presented. However, none of the interviewed state DOTs reported significant difficulties stemming from this situation.

Lessons Learned

State DOTs reported several lessons learned that address uses of 2.0 tools and considerations in implementing, managing, updating, and evaluating types of applications.

- ***Carefully consider the array of 2.0 tools.*** Each 2.0 tool has its own 'culture,' typical communication style, user expectations, and functionalities. For example, Twitter allows users to provide short 'blasts' of information; users generally do not expect to use this tool for formal communication. On the other hand, wikis can allow users to share in-depth information in a more formal environment. Users generally do not expect to submit and receive comments via wikis, while social media are typically focused on providing opportunities for users to post and view others' comments. Agencies should carefully consider the array of 2.0 tools and which specific applications will best suit their business needs and objectives.

- ***Determine how 2.0 initiatives will support the agency's core business mission.*** Any 2.0 applications used should support accomplishing an agency's core business mission. To encourage stronger links between 2.0 tools and their objectives, agencies should consider developing a clear plan prior to implementing a 2.0 tool that outlines the goals of the initiative. The plan could address staff responsibilities for the sites, policies and guidelines for internal and external site use, as well as clarification on the tools' objectives. Defining expectations from the outset will help clarify upper management's perception of the value that 2.0 tools can bring the agency and what amount of staff time is necessary to manage and maintain the applications.

  Some important questions to ask prior to implementing a 2.0 tool can include:
  - Who is the target audience?
  - What information will be communicated?
  - How often will information be provided or updated?
  - Does this particular 2.0 tool offer an effective mechanism for communicating this information?
  - Is public commenting desired and if so, does the tool easily support public commenting?
  - Who will be responsible for responding to public comments and how often are responses expected?
  - Who will manage the 2.0 tools and will it be necessary to train staff to use them?
  - Are necessary security measures and records management processes in place?

- *Consider using 2.0 applications that are available rather than create new ones.* Some agencies reported benefits from using existing 2.0 applications rather than creating in-house versions of these applications, which could require significant staff time or cost. For example, MoDOT reported that it purchased software for several hundred dollars to develop its EPG wiki, although free wiki software is now readily available. It is important to carefully consider the tools' intended purpose when determining whether to use existing technologies. Although Twitter is free and relatively simple to use, MDOT expended $8,000 and worked with a consultant to develop its Twitter sites, precisely because of the agency's desire to have additional support to help manage and update the sites during emergency events, such as a hurricane.

- *Consider both traditional and nontraditional ways to advertise 2.0 sites.* An agency can use different strategies to encourage users to access its 2.0 tools. For example, state DOTs can consider use of paid advertisements such as traditional television spots or radio public service announcements. Some nontraditional routes could include use of paid advertisements on social media sites or other tools that allow advertisements. As an example of another nontraditional strategy, MDOT might purchase gas pump "toppers" to heighten awareness of its Twitter feeds for its Hurricane Evacuation Guide.

  Additionally, agencies can cultivate public awareness of 2.0 sites through favorable publicity that results from press releases, newspaper coverage, or simply through word-of-mouth among users. Several state DOTs stated that they received a large amount of free publicity from local papers and radio stations after launching their 2.0 applications. RIDOT reported that when the *Providence Journal* covers stories related to their agency, it includes a link to RIDOT's Facebook and Twitter pages. Similarly, WSDOT noted that traditional media can help drive users to social media sites by including links in articles or news announcements. Advertising the sites can also be folded into existing internal business procedures. For example, TxDOT promoted its social media sites by including links in its staff's email signatures.

- *Use 2.0 tools to complement, rather than replace, traditional media*. All of the agencies interviewed reported that 2.0 tools can complement existing outreach avenues and do not necessarily have to replace them. While state DOTs' uses of 2.0 tools are innovative in helping agencies communicate with stakeholders in newer ways than in the past, these sites generally have not displaced or replaced traditional methods of interaction like press releases and public meetings. New 2.0 tools can in fact drive increased traffic to agencies' traditional websites and vice versa.

- *View critical comments as constructive comments.* Prior to implementing 2.0 tools, state DOTs had a common initial concern that allowing public input on the sites could expose the agency to excessive criticism or vitriolic comments. For most of the state DOTs, however, this concern has not come to bear. Generally, most agencies reported that the 2.0 sites "self-regulate," with users respecting posted policies or unofficial, common sense procedures, or even defending the agency if a user posts disproportionate criticism. MoDOT found that the public has often provided constructive criticism that enables the agency to improve its performance.

- *Develop clear policies and guidelines for how external and internal audiences should access and utilize 2.0 sites.* State DOTs commented that it is important to specify as early as possible in the implementation process who in the agency will be able to and encouraged to post and view information on 2.0 sites. Developing specific policies about usage and access can help the agency ensure that information posted is accurate, timely, and reflects the specific objectives of each tool. MoDOT's experience in updating its human resources policy[27] to include employee conduct on social media sites could serve as a template for other state DOTs considering such a policy change. Additionally, setting ground rules for participation might guard against public criticisms (e.g., if the agency decides to remove unacceptable posts) or, more seriously,

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[27] MoDOT's policy blog page: www.modot.org/newsandinfo/PostAComment-UsePolicy.htm.

distracted driving; MDOT explicitly instructs that its hurricane evacuation tweets are for passenger use only.

- ***Review the effectiveness of 2.0 applications****.* Agencies should pursue a structured approach to evaluating 2.0 tools and assessing whether the tools are meeting the agency's and customers' needs. For example, RIDOT requires a preliminary, one-year test period for all new 2.0 applications, thus establishing an agency standard protocol for managing future technological advances. RIDOT believed that this one-year period would allow it time to test the effectiveness of tools while ensuring the ability of different applications to achieve agency goals.

CASE STUDIES

The project team developed case studies for seven transportation agencies from discussions with agency contacts and reviews of related documents. Each case study includes an overview that provides background on each agency's approach to considering uses of 2.0 tools for transportation purposes, any challenges encountered, and lessons learned during these activities. Where possible, information about agencies' future efforts was also included. Brief summaries of the seven agencies are presented below, followed by the full case studies:

- **MassDOT's case study** describes the agency's use of several social media applications, including Twitter and mashups maps, and explains how the agency has focused on publishing open data to encourage third-party data developers to create innovative transportation applications.

- **MDOT's case study** explores the agency's development of six, route-specific Twitter feeds to support the most recent edition of its Hurricane Evacuation Guide. These Twitter sites can provide customized, real-time updates to travelers in the event of a hurricane.

- **MoDOT's case study** details the agency's use of a wiki to streamline internal communications and provides an overview of the agency's use of other 2.0 tools, including Twitter, Facebook, and a mashup for the agency's Traveler Information Map.

- **NCDOT's case study** provides information about the agency's incident management system, which automatically generates Twitter posts to several geographic and route-specific Twitter pages. This case also describes NCDOT's plans to use additional 2.0 tools, such as wikis, to support internal agency communication.

- **RIDOT's case study** demonstrates the agency's use of podcasts to provide project information related to a complex, multi-year highway construction project. Building on the podcasts, the agency also recently launched other 2.0 sites, including Twitter, Facebook, MySpace, and a blog.

- **TxDOT's case study** highlights the agency's use of several 2.0 tools, including Twitter, Facebook, YouTube, and podcasts, to support public engagement in transportation and improve agency responsiveness to public feedback.

- **WSDOT's case study** illustrates the agency's adoption of a range of 2.0 tools, such as a blog, Twitter, Facebook, YouTube, and Flickr. WSDOT is building upon those applications that are well-received and experimenting with use of other technologies, such as providing live broadcasts of public meetings.

Massachusetts DOT Case

Background

Massachusetts DOT's (MassDOT) implementation of 2.0 sites in 2009 evolved from a desire to stay current with new technologies being adopted in transportation agencies in other states. In addition, the 2009 reorganization of Massachusetts' transportation agencies into one state DOT generally led to the use of new agency business practices, including use of social media, to provide transportation information to a wider audience.[28] MassDOT received positive public feedback soon after developing its first social media sites. This early success helped to further upper management's support of the effort.

MassDOT currently uses several 2.0 tools, including Twitter, Flickr, YouTube, mashup maps, and maintains a blog, *Commonwealth Conversations* (see Figure 1). These applications are primarily used to inform stakeholders about agency news and to obtain public feedback on agency projects or events.

Figure 1. MassDOT's blog, *Commonwealth Conversations*.

MassDOT has additional applications tailored to certain stakeholder groups and used to support collaboration between these groups and MassDOT. For example, MassDOT developed a Twitter account (separate from its main Twitter page), a Facebook page, a Slideshare page, and a Google document focused on activities related to third-party data developers working with MassDOT data.

During a MassDOT-sponsored developers' conference, attendees posted notes through the developers' Twitter page, providing real-time information to interested individuals who were not in attendance. The conference, Twitter account, and Facebook page were launched as part of MassDOT's developers' initiative, through which MassDOT makes its transportation data available to third parties to encourage production of innovative mobile phone- and web-based applications for the public.[29]

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[28] Other Massachusetts state agencies using social media include the Office of the Governor (see www.mass.gov/?pageID=gov3homepage&L=1&L0=Home&sid=Agov3). The Office of Administration and Finance has also posted social media 'toolkits' on its website to provide guidelines on use of social media. The toolkits are available at bit.ly/4UhHXP

[29] The initiative, which began in 2009, also involved implementation of a "developers' page" on the MassDOT website (at www.mass.gov/eot/developers). Data released through the page includes transit route and schedule data, planned construction event data, and other information. A competition held during the developers' conference resulted in several applications that might be released to the public in the future. Some examples are available at www.massdotdevelopersconference09.com/applications.

While MassDOT does not formally advertise the sites, all of the sites and brief descriptions are listed on the agency's main webpage.[30]

Management Approach and Policies

MassDOT did not create new staff positions to manage or maintain the 2.0 applications. Instead, responsibilities for updating these sites were folded into two existing staff positions in the communications office. As the number of comments grows on the sites, MassDOT might consider adding a public relations position to help manage feedback and responses to comments. In the future, MassDOT might also consider use of social media tools for incident reporting.

All MassDOT staff can access and view the 2.0 sites from their workstations. However, with the exception of the MassDOT Secretary, who posts Twitter content, staff members outside the communications office are not permitted to post to MassDOT's social media sites.

MassDOT has developed a general privacy policy for all of its websites, including social media sites, and all blog comments are moderated before posting.[31] After filtering inappropriate comments or spam items, MassDOT posts every blog comment it receives and attempts to respond to each of them.

Evaluation and Benefits

MassDOT does not have a formal evaluation policy or procedure to assess use of 2.0 applications. However, the communications office staff periodically monitors the number of site visitors using Google Analytics software. The agency noted that quantitative metrics (such as user statistics) do not necessarily provide a complete picture of whether an application is meeting users' needs. More in-depth analysis is required to understand whether the sites help MassDOT meet its goals and are useful to intended audiences. The staff anticipates the development of more formal evaluation procedures and performance measures in the future to support this type of analysis.

Even without a formal evaluation, MassDOT believes that use of the sites over time has helped the agency meet business goals and better serve its customers. MassDOT reported that the sites have specifically helped to:

- *Support a stronger customer-agency relationship*. Using traditional media sources, information typically flowed from MassDOT to media channels and then to customers, rather than from customers to the agency. In this traditional model, the public did not seek to interact with MassDOT except when expressing concerns or frustrations. By implementing applications that allow MassDOT to converse directly with the public, the agency believed it had been able to better respond to customers' concerns and, in return, encourage customers' positive views of MassDOT.
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- *Streamline information sharing*. Information that might not rise to the level of a press release can be quickly and easily posted on a blog or on the agency's Twitter page. These sites also support internal MassDOT communications by allowing staff from all business areas to view news and updates from across the agency in real-time.

Lessons Learned

MassDOT staff noted several lessons learned from its experiences with 2.0 applications and social media sites:

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[30] MassDOT social media website: www.massdot.state.ma.us/main/MassDOTSocialMedia.aspx
[31] MassDOT's privacy policy: www.eot.state.ma.us//default.asp?pgid=content/Privacy&sid=about

- ***Promoting open data-sharing can lead to innovative 2.0 applications***. Third-party developers likely already have the resources to create data applications and it is not always cost-effective or efficient for MassDOT to develop these applications in-house. To create useful applications, however, third parties typically need access to up-to-date, comprehensive data. In promoting open data through its developers' initiative and related social media tools, such as the developers' Twitter page, MassDOT has found that software developers can create innovative applications that will benefit both customers and the agency.

- ***Carefully consider resource investment in social media***. While use of social media can be a cost-effective mechanism to share information and receive public feedback, it is important to assess costs and benefits before developing these types of sites. MassDOT found that managing and maintaining the sites took less time and staff resources than initially anticipated.

- ***2.0 sites should be tailored to meet customers' needs***. Agencies should carefully consider how 2.0 sites will respond to and meet customers' needs. Evaluating these needs—and tailoring the sites accordingly—can be challenging. Use of several evaluation metrics can help provide a more comprehensive picture of whether a site is meeting customers' needs and advancing the agency's mission.

- ***Be consistent when providing information through multiple social media channels***. If distributing information through a variety of 2.0 channels, it can be challenging to maintain a consistent agency "brand." To promote authenticity and legitimacy, agencies should be consistent when posting news. For example, agencies can use the same handle (e.g., "DOT") to identify all of its Twitter posts. Despite these challenges, using multiple channels to share information can expand the agency's reach to more stakeholders.

- ***Build systems with 2.0 tools and open data in mind***. Many legacy information systems were designed before there was an identified need to distribute information directly to customers. For example, MassDOT's transit authority's real-time bus data system was built to allow operations center staff to review data and then provide a synthesis of real-time conditions to the public. The system was not designed to broadcast feeds directly to the public regarding scheduling delays or other issues. Retrofitting this existing system to provide public feeds to the MassDOT developers' website[32] will require additional investment. To prevent this situation from occurring in the future, agency staff should take 2.0 tools into consideration when building new systems and making updates to existing systems.

Next Steps

MassDOT anticipates several steps to expand and enhance the content that it posts to social media sites. It hopes to post videos of public meetings within an hour of the meeting's completion. MassDOT also envisions building customizable tools to provide information to its customers. MassDOT is considering creating a system that could provide public feeds on road closures, since this is the specific information that many customers want to have. However, before taking this approach, MassDOT will look for more data sources to make available to third-party data developers, so that developers might be able to build such a tool at no cost to MassDOT.

MassDOT is discussing the possibility of adding new Twitter accounts targeted to customers in certain regions of the state or to specific stakeholder groups. For example, an account targeted at bicyclists would include information about bicycling facilities, events, and laws. The agency believes that having multiple Twitter accounts tailored to certain groups will make it easy for users to find the information they need. Posting all agency news to one account could make it difficult to find information relevant to one topic.

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[32] MassDOT Developers Website: www.eot.state.ma.us/developers/

As the agency expands use of 2.0 sites, it anticipates that some staff time might need to be reallocated from current activities to manage the applications and respond to public comments. These needs will likely be met by engaging existing staff within MassDOT to monitor and post to 2.0 sites.

Resources

MassDOT's blog, *Commonwealth Conversations*: transportation.blog.state.ma.us/blog/

MassDOT's Data Developers' Google Group: groups.google.com/group/massdotdevelopers?pli=1

MassDOT's Facebook page: bit.ly/dy8pxG

MassDOT's Flickr page: www.flickr.com/search/?q=massDOT

MassDOT's Slideshare page: www.slideshare.net/massdotdev

MassDOT's Twitter page: twitter.com/massdot

MassDOT's YouTube Page: www.youtube.com/youmovemass

Example of a MassDOT mashup map: www.massdot.state.ma.us/rmv/BranchInfo/BranchMap.aspx

Mississippi DOT Case

Background

In 2005, Hurricanes Katrina and Rita highlighted the need for Mississippi DOT (MDOT) to have robust systems, including those for communication, to support a large-scale public evacuation in the event of an emergency. Wanting to enhance existing procedures rather than create new ones, MDOT decided to develop route-specific Twitter sites to disseminate evacuation information in the event of a hurricane. MDOT highlighted the new Twitter sites in the agency's most recent update of its Hurricane Evaluation Guide.[33] The guide, which is updated annually, is provided in hard copy via newspaper circulation routes, to libraries, and other public places; features a map of hurricane evacuation routes; and includes emergency contact information.

MDOT has now developed six route-specific Twitter sites to provide content from the guide to the public (see Figure 2). The initial focus is on providing real-time, route-specific emergency updates for the six main evacuation routes in the southern half of the state.[34]

Although available online, the sites do not currently have any content or have limited content, as there have not been any hurricane events since their implementation.

However, the information that will be provided on the sites will include real-time updates on travel conditions, traffic delays, contraflow routes (i.e., roads that have altered traffic flows), fuel availability, and roadway openings. MDOT does not believe that use of the Twitter sites will replace its .
traditional information dissemination tools. Rather, the sites will complement and supplement existing agency information channels, including the Hurricane Evacuation Guide.
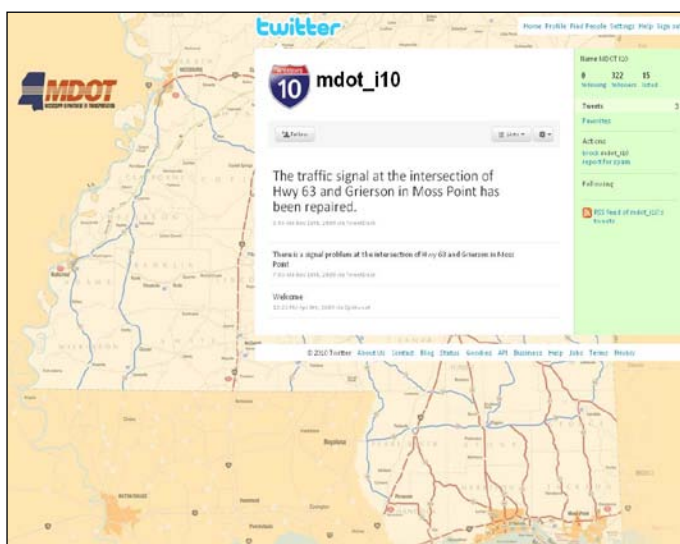
Figure 2. MDOT's I-10 Hurricane Evacuation Twitter Page.

Development of Twitter Hurricane Evacuation Guides

Obtaining upper management's support for the sites was not difficult, as there was general agreement about Twitter's utility in helping MDOT meet business goals and the public's information needs at a relatively small cost. For approximately $8,000, MDOT worked with a consultant to implement the route-specific Twitter sites. The consultant developed a mock-up of the sites and, along with the MDOT public affairs staff, presented the concept to upper management. The consultant also purchased off-the-shelf software to support running six Twitter accounts simultaneously. The company set up a back-up system in an office outside the traditional Mississippi hurricane zone as a precautionary measure in case a hurricane affected local offices.

Seventy-two hours prior to a predicted hurricane or tropical storm, MDOT plans to launch 15-second television commercials and radio public service announcements alerting the public to the imminent

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[33] Available at www.gomdot.com/Home/EmergencyPreparedness/pdf/HurricaneEvacuationGuide.pdf.
[34] Interstate (I)-10, I-20, I-55, I-59, U.S. Route 49, and U.S. Route 98

hurricane and encouraging the public to sign up for Twitter accounts to receive real-time evacuation information. The television commercials, which have been produced but have not yet aired, are MDOT's only planned advertisement for the Twitter sites. The agency has discussed placing "toppers," or signs, on gas pumps around the state to advertise its Twitter feeds. It is also considering placing temporary window stickers, or "clings," at gas stations in advance of forecast hurricane events.

With an approaching hurricane forecast and public announcements made, the primary source of information for the feeds will come from MDOT field representatives and information collected from other various sources by the consultant. MDOT will also be able to retweet information from the Mississippi Emergency Management Agency. During emergency situations, a consultant will collect information on fuel availability by telephoning individual gas stations that are listed in a database unique to each evacuation route. Additionally, the consultant will survey available lodging and provide contact information to evacuees via tweets. To ensure that MDOT will be able to focus on critical operations during an emergency event, an email address was established that automatically forwards updates on roadway and travel conditions to the consultant. It is expected that this will enable the consultant to upload Twitter feeds without relying on manual input from MDOT.

As there were no major hurricanes affecting Mississippi during 2009, MDOT and its consultant tested the Twitter guides during a relatively minor tropical storm event. This small-scale pilot, which cost $750 to implement, worked smoothly and no obstacles in the test were encountered.

Anticipated Benefits

MDOT expects two primary benefits from use of the Twitter sites:

- *Twitter will help provide real-time information that is tailored to specific evacuation routes identified by each user.* Since Twitter can be accessed via mobile devices, the public should be able to use the application to access information "on-the-ground" and while making decisions about where to travel.

- *2.0 sites will help leverage its existing staff resources.* For example, MDOT's emergency call center has approximately 20 staff members from the Public Affairs Office. During an emergency, the center typically receives a large amount of telephone calls from the public and must rely on additional staff to help answer the calls. MDOT anticipates that use of Twitter will lessen the staff burden by streamlining the processes for providing necessary information to travelers and responding to their questions or concerns.

MDOT has gauged these potential benefits by assessing the current number of followers. To date, approximately 1,600 people have signed up to follow one of the six route-specific sites. In the absence of a major emergency or advertising campaign to encourage users to make use of these sites, MDOT believes the number of Twitter followers indicates the effectiveness of word-of-mouth advertising. Local news reports have also been an important catalyst for encouraging users to sign up for the feeds. MDOT anticipates that the number of followers on the sites will significantly increase during the next major hurricane. MDOT plans to measure any reduction in call volume during emergency events and assess whether that might be attributable to use of the Twitter sites.

Lessons Learned

- *Consider whether sites should be route or region specific.* Before implementing social media sites, it is important to consider how to tailor the information to best meet customers' needs. MDOT noted that many state DOTs have created Twitter accounts that provide users with region-specific information. MDOT believes that its customers would like to receive updates regarding their specific route, rather than updates on the region in which they are located.

- *Consider use of a consultant to maintain social media sites, particularly during emergency events.* Although Twitter is a relatively simple application to develop, MDOT reported that it has

been very useful to work with a consultant on implementing and managing the sites. Initially, MDOT was concerned that it would not be able to update and maintain the sites as needed during emergency events since staff would be focused on critical operations issues. Having a consultant update the sites might lessen agency staff's workload in terms of providing real-time traffic and roadway condition information, during emergencies.

- ***Provide guidelines on use of 2.0 tools to prevent distracted driving*** Using Twitter for transportation-related information sharing raises the concern that they might contribute to distracted driving. MDOT reported that agencies can provide usage guidelines, such as recommending that drivers check the sites before entering their vehicles while they are stopped or to leave monitoring the sites to a passenger. MDOT anticipates that dashboard displays might be developed in the future that can receive and display feeds. Such displays could minimize the need to check mobile devices while in the car.

Next Steps

In the future, MDOT plans to measure any reduction in call volume during emergency events and assess whether that might be attributable to use of the Twitter sites. Since development of the sites, MDOT has received questions and feedback from several other state DOTs. This interest suggests a general need for developing transportation 2.0 tools that can disseminate real-time information to the public. In 2009, the American Association of State Highway and Transportation Officials (AASHTO) named the MDOT Twitter sites as one of top 10 developments in transportation, leading the agency to believe that the sites represent an emerging effective practice.

MDOT also anticipates that it will expand its 2.0 implementation to include other social media sites, likely with the assistance of the same consultant that developed the Twitter sites. For example, MDOT has considered providing traffic updates during ice events, perhaps targeted to the northern areas of the state. This would help to disseminate general traffic information via Twitter, expanding upon text message traffic updates that are already available year-round.

In addition, MDOT is currently evaluating use of YouTube as a tool to raise public awareness on bridge ratings across the state and use video vignettes to support public consensus that additional Federal funding is needed to repair bridge infrastructure. The agency is working with a consultant to launch the site, which is expected to go live in March 2010.

Resources

MDOT's Hurricane Evacuation Guide:
www.gomdot.com/Home/EmergencyPreparedness/pdf/HurricaneEvacuationGuide.pdf

MDOT's hurricane evaluation route-specific Twitter pages: twitter.com/mdot_i10; twitter.com/mdot_i20; twitter.com/mdot_i55; [twitter.com/mdot_i59;](http://twitter.com/mdot_i59) twitter.com/mdot_us49; twitter.com/mdot_us98

Missouri DOT Case

Background

For government agencies, the Missouri Department of Transportation (MoDOT) was an early adopter of 2.0 technologies. MoDOT's first 2.0 application was developed in 2004: a wiki-based version of the Engineering Policy Guide (EPG), a document that serves as a single reference for all engineering and engineering-related guidance for the agency (see Figure 3).

Figure 3. MoDOT's EPG wiki.

Prior to the EPG wiki, the agency relied on a Microsoft Word document and a database to manage comments. In 2004, a MoDOT engineer suggested use of a wiki to streamline its approach for allowing staff to add comments to the EPG. Now the wiki-based EPG is the standard method by which the agency solicits staff feedback on the manual. A log on the wiki homepage, which had been accessed over 210,000 times (as of January 2010), enables viewers to see recent changes to the wiki. Additionally, a help article posted to the wiki[35] details the approval process and how MoDOT staff can sign up for a user identification (userID) that enables them to track and view changes on the wiki. Once users have established a userID, they can set their preferences so that any time a change is made to a particular page in the EPG, they will receive an update. The wiki-based EPG wiki helps to maintain a living document, one that is continually updated with best practice information gathered from the field and effectively conveyed back to agency staff.

Building on the agency's success with the EPG wiki and with the hire of a Community Relations Director who embraced the use of new media, the agency experimented with other 2.0 applications. Now, MoDOT uses RSS feeds, Flickr, and mashups that combine MoDOT data with Google Maps to display geographic information for the traveling public. MoDOT also uses a variety of social media services, including Facebook, YouTube, Twitter, a blog, and podcasts, to provide information to external audiences.

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[35] EPG wiki help article: epg.modot.org/index.php?title=Help:Contents

Initially, these 2.0 applications were not publicly posted due to concerns about how MoDOT would manage incoming public feedback. This changed in January 2008 when the Governor of Missouri launched a YouTube site that helped elicit broad support among MoDOT leadership for making its social media applications available to the public.

To further bolster support, MoDOT's Community Relations Division invited a social media advocate to speak to the agency. The advocate helped to strengthen upper management buy-in and suggested ways to refine MoDOT's communication approach. For example, the advocate encouraged MoDOT to use a more casual tone and write in the first person when adding news to social media sites. Prior to this, MoDOT had generally copied press releases on its blog and other social media sites rather than create new content specific to the sites.

To notify the public of MoDOT's new social media sites, the agency issued a press release via fax, email, and on the blog itself. It also purchased several Facebook advertisements to generate publicity. Each advertisement costs approximately $250 and includes a line of text and a picture. These ads appear on Facebook itself, on the right-hand side of the page, and were crafted to encourage viewers to become a fan of MoDOT. The ads target Facebook users in Missouri who are over the age of 18 and not already fans of their page. MoDOT created an advertisement to notify the public when the updated Missouri map was published. In another advertisement targeted to Missouri college students, MoDOT encouraged customers to check the Traveler Information Map when returning to school after summer vacation.

2.0 sites have not replaced MoDOT's traditional public outreach efforts. Rather, they serve to augment previous communications activities. Press releases are still provided via traditional media and all posts are available on the MoDOT website.

Mashup

MoDOT's Traveler Information Map is a mashup that combines the functionality of Google Maps with MoDOT traffic and other data (see Figure 4). The map provides a variety of data to users on travel information, road conditions, and other travel-related information.[36] Users can choose which data are displayed.
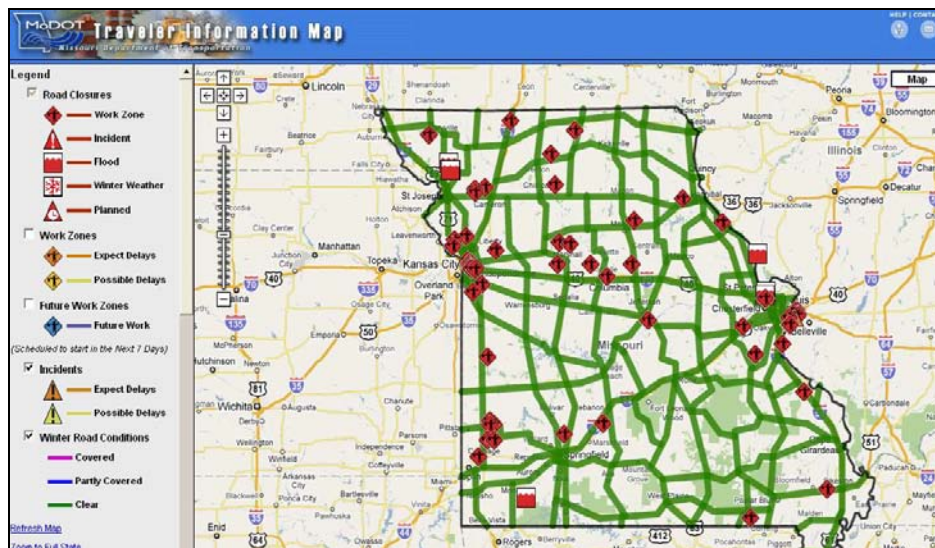

Figure 4. MoDOT's Traveler Information Mashup Map.

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[36] Other states, including Tennessee, Kansas, and New York, have developed similar maps that were modeled from MoDOT's map. Additionally, MoDOT has won multiple awards for the mashup, including the 2009 Governor's Award for Quality and Productivity.

MoDOT's GIS division initially developed a GIS-based version of the Traveler Information Map. However, in 2007, the division chose develop a Google Maps-based mashup version of the map as it was more user friendly and aesthetically pleasing. Using data from MoDOT's Traffic Management System, MoDOT developed a mock-up of the Google Maps mashup and provided it to management. A staff member then worked for three weeks to fully develop and launch the mashup. MoDOT staff noted that use of Google Maps as a base map for their mashups is inexpensive. There is no fee for the use of the maps and Google's open source code makes these mashups relatively simple. In addition, MoDOT makes its mashup code available for other agencies to modify if they wish.

The shift to a Google Maps mashup was also designed to reduce stress on the agency's server and accommodate more users who accessed the site. Previously, the load time for the Traveler Information Map was fairly long. Before implementing the Google Map version of the website, each time a user refreshed the map, all of the data had to be transmitted from the agency's server, creating delays when many users accessed the site at the same time. Using the Google Maps mashup, MoDOT superimposed data onto a Google Map, freeing space on the agency's server and reducing delays. It is estimated that 50,000 people per day can now access the site without slowing load times.

Although there have been significant benefits to using Google maps, there are also drawbacks. MoDOT is currently evaluating whether or not is will move the Traveler Information Map back to a GIS-based system. The agency has found its lack of control over the Google base map to be a limitation with the mashup. MoDOT finds that the base maps are frequently not as accurate as the agency would like them to be, and Google has been unable to respond to agency requests to update its maps. In addition, changes in MoDOT's Transportation Management System work zone database now make it more difficult to overlay the agency's icons over the Google Map base map. To address these issues, MoDOT is now exploring moving to a "Flex-based map" in which the map programming will become much smaller and easier to maintain and repair. An added benefit is that the base map would have the same up-to-date data included in the agency's highway map.

Management and Administrative Approach

MoDOT did not hire new staff to maintain its 2.0 sites but instead folded responsibilities into an existing staff position organizationally located in the Community Relations Division. This staff member manages all of the sites, tracks user postings and feedback, and updates the sites, aiming for at least three updates per week. Others in MoDOT, including division directors, are encouraged to contribute videos, photos, and other content or contact the Community Relations Division with ideas for new postings. While 2.0 site maintenance was initially a concern, in general, this concern has not been realized, and staff report that the workload has been manageable.

Technical Considerations and Cost

MoDOT has not incurred any additional costs associated with the use of 2.0 sites other than the staff time that the agencies devoted to launching and maintaining the sites and the up-front cost to purchase blog and wiki software. Generally, MoDOT has used free versions of software to create 2.0 and social media applications (It was estimated that developing a MoDOT blog using customized software would cost $40,000.). Sites have been developed in-house.

While use of free software has benefits, it also comes with some challenges. For example, MoDOT noticed that other transportation agencies' social media pages often include banners on the top of the page that display the agency's logo and do not contain advertising. Occasionally, on MoDOT's sites, non-agency links and pop-up advertisements will appear. MoDOT staff contacted YouTube to determine whether the agency's page could be customized to include a banner without advertising, but was told that this customization might cost approximately $250,000. This was beyond MoDOT's budget for 2.0 application use.

Policies and Evaluation

MoDOT maintains a blog policy page.[37] The Community Relations staff reviews all blog comments before being posted to the site. Comments that are off topic, political in nature, or are otherwise inappropriate are rejected, but this does not often occur. MoDOT reported that approximately one or two comments per month are rejected from the blog. Anonymous commenting is generally allowed except on Facebook and Twitter, which require users to set up a profile before posting a comment. All MoDOT staff are able to view the agency's social media sites while using their work computers and are encouraged by management to interact with the sites and add comments to them.

The Community Relations staff monitors comments on Twitter and Facebook to ensure that they adhere to the agency's use policy. Despite the fact that comments on Facebook, YouTube, and Twitter cannot be reviewed before being posted live, only a few inappropriate comments have been removed after posting due to their inappropriate nature. MoDOT informs users, when possible, if their comments are removed from the social media sites.

Staff from the Community Relations, Information Systems, and Human Resources Divisions are currently developing recommendations on social media guidelines and standards to add to human resources policies. When determining appropriate social media policies, MoDOT has looked to other government agencies to identify best practices.

Regarding evaluation, MoDOT holds quarterly meetings to determine if the social media sites are meeting goals based on a variety of metrics, including number of blog posts, number of fans and followers, and overall and repeat visitors to these sites. These metrics for evaluating its 2.0 sites have been integrated into its *Tracker* system,[38] which evaluates overall agency performance.

Lessons Learned

MoDOT reported the following lessons learned from its use of 2.0 applications:

- ***Use of 2.0 sites can augment public outreach***. MoDOT recently posted a YouTube video of a roadway project, seeking input. While MoDOT held public meetings on the project, total attendance was less than 200. However, the video about the project has been viewed almost 13,000. MoDOT credited the video with helping to spur public interest in the project and reach people who did not attend the public meetings.

  Although some sites might receive less public attention than others (e.g., MoDOT blog receives significantly fewer comments than are received via Facebook and Twitter), the suite of 2.0 tools can still allow agencies a place to post information that would not otherwise have a suitable outlet. Some of MoDOT's posts to Twitter and Facebook would not rise to the level of a press release, but MoDOT still believes that they are important to communicate.

- ***It is important to consider constructive criticism provided via 2.0 sites***. MoDOT's early fears about receiving public criticism on the sites have not been realized. In fact, the agency found that social media sites can be self-regulating. For example, if a user posts a vitriolic comment, other users frequently address it. Other public feedback has provided criticism that MoDOT has found to be constructive.

- ***2.0 policies can be developed over time***. Agencies can move forward to implement 2.0 sites even if use policies are not fully formed. MoDOT found it beneficial to address issues when they occurred rather than setting policies in advance. This approach allowed MoDOT the flexibility to tailor and target policies to address key recurring issues.

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37 MoDOT's blog policy page: www.modot.org/newsandinfo/PostAComment-UsePolicy.htm
38 Available at www.modot.mo.gov/about/general_info/Tracker.htm.

- ***Maintaining and updating 2.0 sites does not have to be expensive or labor-intensive***. Processes to update and maintain 2.0 sites can be as simple or as advanced as an agency would like. The agency found it useful to focus its energies on responding to questions and concerns rather than each tweet or comment. In addition, as use of the sites grows, MoDOT staff reported that users typically begin to dialogue with one another.

- ***It is important to have a streamlined process for updating sites***. One of the benefits of 2.0 sites is the speed with which users can generate content. If an agency is unable to streamline its posting and response times, it will likely find that sites are of limited use. A streamlined management processes will allow staff respond to questions and concerns without requiring approval for each response.

- ***Mashups provide a useful platform for Internet-based mapping services.*** Despite some challenges, MoDOT reported several benefits to using Google Maps in its mashup. The service is free with minimal up-front costs. The maps are user friendly and aesthetically pleasing. Additionally, use of a mashup relieved internet traffic from MoDOT's server and enabled the agency to handle more traffic on its own website.

Next Steps

MoDOT stays current with new technology developments by monitoring several websites, such as www.mashable.com, and following transportation agencies and organizations on Twitter. MoDOT will continue encouraging more dialogue on MoDOT's Facebook page and gaining new fans. The agency recently began a DIGG account.

While noting that its blog is not as popular as it used to be, MoDOT has no plans to discontinue its use. The agency believes that the blog feeds content to other MoDOT social media sites and website. The agency experienced some challenges with using RSS feeds, such as RSS readers not yet being part of Web browsers. As a result, MoDOT is currently exploring use of JavaScripts to allow users to track new content. It is also considering adding a more user-friendly and interactive electronic format for an internal newsletter that is posted online for public review.

Finally, while use of the Google Maps mashup initially led the agency away from a GIS-based traveler map, MoDOT is now considering whether to move back to this type of map because the agency cannot update the Google Map with current information.

Resources

MoDOT's Engineering Policy Guide wiki page: epg.modot.org

MoDOT's blog: modotblog.blogspot.com

MoDOT's Facebook page: www.modot.mo.gov/facebook

MoDOT's Flickr page: www.flickr.com/photos/modot

MoDOT's Next Generation Desktop wiki page: not currently available

MoDOT's Twitter page: www.modot.mo.gov/Twitter

MoDOT's Traveler Information Map mashup: maps.modot.mo.gov/travelerinformation/

MoDOT's YouTube page: www.youtube.com/modotvideo

North Carolina DOT Case

Background

North Carolina DOT (NCDOT) began using 2.0 applications as a response to increasing requests for information from local media. Together with information technology (IT) staff, the NCDOT public affairs department developed mock-up applications illustrating application functions and sample content. Public affairs staff provided these mock-ups to upper management to demonstrate the benefits of a new interface with the public and to garner leadership buy-in.

With management support obtained, NCDOT now maintains a variety of 2.0 applications, including Facebook, Twitter, Flickr, and YouTube. The primary purpose of these sites is to disseminate information to both the media and the public and to provide a new degree of agency transparency. For example, videos of key meetings (particularly those related to budget issues and stimulus spending) are made available to the public via YouTube. As another example, NCDOT developed an incident management system in 2005 that tracks incident status based on a system of codes reported from responding field staff. The system initially generated only text messages but was recently updated to generate tweets automatically about roadway conditions across North Carolina. The traveler information program has also been integrated to the agency's Facebook page (see Figure 5). Additionally, some divisions use Microsoft Sharepoint sites to share documents, images, and other information among project teams.
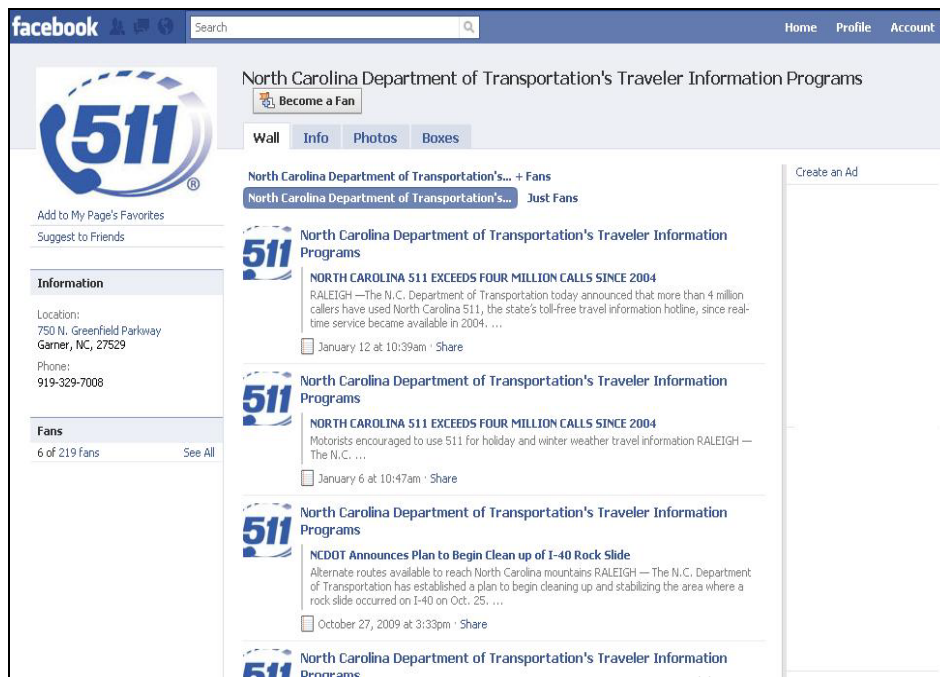
Figure 5. NCDOT's Facebook Page.[39]

Management Approach and Policies

NCDOT does not have any formal policies for managing content on its 2.0 sites and does not limit staff access to 2.0 applications from workstations. While staff throughout NCDOT can send input or suggested content for the sites, only web development and public affairs staff have the ability to post or moderate content. In most cases, however, the web development and public affairs staff produce content for the sites based on their knowledge of ongoing projects or other agency news.

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[39] Identifying information appearing on this screenshot has been removed.

Public feedback mechanisms on the 2.0 applications are currently restricted due to limited staff time and availability to respond to comments and because of concerns about the volume of feedback potentially generated. To help address this issue and augment staff resources, NCDOT hired one public affairs staff person to focus on management of 2.0 content and on the feedback it generates. The agency is also considering hiring two additional staff to help manage the sites.

Evaluation

NCDOT does not have a formal method to evaluate the effectiveness of its 2.0 applications. However, the applications are informally assessed to ensure that they help meet business goals and support NCDOT's core mission. The public affairs staff cites increased traffic to these sites, positive feedback, and reductions in questions about project schedules as evidence that the applications are providing valuable information. Over time, the agency has noticed a reduction in negative feedback and questions about project schedules.

Benefits

NCDOT described several benefits from its use of 2.0 applications. For example, in providing information about agency activities, NCDOT reported that social media sites support citizen engagement and increase citizens' knowledge of agency activities, news, and projects. Additionally, these forums allow NCDOT to more quickly and easily respond to questions. Also, rather than respond to the same question posed by different individuals at different times, NCDOT staff can answer questions on a public forum, allowing all customers to view the response and reducing the number of inquiries.

Another benefit has been the ease with which the public can obtain information. NCDOT has developed a number of Twitter feeds that are targeted to specific regions across the state or specific transportation modes, such as a Twitter feed tailored to ferry customers. Having separate feeds for particular roadways or districts has allowed the public to subscribe to and receive only the content that they view as valuable.

Lessons Learned

NCDOT reported the following lessons learned from its use of 2.0 applications:

- ***Sharing information with the public can shift perceptions of the agency.*** NCDOT believed that individual citizens might not have a complete understanding of a state DOT's mission, activities, or policies. Receiving frequent updates from a state DOT via 2.0 tools can help the public better understand an agency's daily functions, leading to a more positive perception of the agency.

- ***It is important that 2.0 tools support agencies' core business missions.*** Use of 2.0 tools needs to increase the effectiveness or efficiency of agency business. If these tools do not support the agency's core business objectives, leadership support will likely wane. Developing an agency-wide mission statement regarding 2.0 applications can help to clarify the intended purpose of the tools and facilitate staff coordination or management processes. In addition, use of mockups can help illustrate to staff what the tools will look like once completed. To obtain upper management support, it might be particularly important to demonstrate that 2.0 tools will not create additional staff workload.

- ***Use of 2.0 tools can provide time and cost savings in the long-term even if staff resources are needed up front.*** To help manage the 2.0 applications, NCDOT hired new public affairs staff. While there was a cost associated with these hires, NCDOT noted that the use of its 2.0 tools has provided long-term time and cost savings. Significant benefits have been derived from the sites; use of other mechanisms to achieve the same benefits might have involved more cost and time than 2.0 tools. Overall, the sites are a good investment.

Next Steps

In the future, NCDOT staff expect that agency-wide wikis, blogs, forums, and personal 2.0 pages will be implemented to address information silos within the agency and to increase customizable information sources about agency activities. In fact, a wiki that will centralize all IT questions and requests is expected to be ready for use in February 2010. In addition to enhancing internal communications, NCDOT anticipates new enhancements to existing 2.0 sites. For example, NCDOT is now working to make all agency meetings available on YouTube within two hours of the meeting's conclusion.

NCDOT's web development team also envisions building a system in which the public could subscribe to particular areas or topics of interest (e.g., commute path, residence location, work location) and be notified of planned or ongoing activities in these areas. Finally, NCDOT is exploring use of 2.0 applications to allow remote participation in virtual meetings or to communicate with contractors and streamline invoicing.

References

Example of NCDOT mashup maps: www.ncdot.org/recovery/recoveryprojects/

NCDOT's Facebook page: www.facebook.com/pages/Garner-NC/North-Carolina-Department-of-Transportations-Traveler-Information-Programs/44545158699

NCDOT's Flickr page: www.flickr.com/photos/ncdot/4058239304/

NCDOT's Twitter page: twitter.com/ncdot

NCDOT's YouTube page: www.youtube.com/user/NCDOTcommunications

Rhode Island DOT Case

Background

In 1999, the Rhode Island Department of Transportation (RIDOT) embarked on a $610-million, 12-year project for improvements to the Interstate (I)-195/I-95 interchange in Providence, Rhode Island. The project, called the Iway, was designed to improve traffic flows, enhance access to downtown Providence, and open up key downtown waterfront parcels for redevelopment. Major sections of the project are now complete although demolition of sections of the old I-195 and exit relocations are still in process as of January 2010.

The Iway is the most expensive and complex project that RIDOT has ever undertaken. The project has had major impacts in Providence, the state's capital, and has affected two of the three highways in the city. Because the project is multifaceted, RIDOT officials understood the need to provide clear information and visuals about the project to residents and motorists in an efficient and effective manner. To do so, RIDOT decided to convert existing video footage, images, and computer-simulated models into an educational audio-visual series available via links from RIDOT's website.[40] The agency launched these Iway video podcasts in 2007.[41] RIDOT's chief public affairs officer enhanced this public outreach endeavor by leading a campaign to introduce social media applications such as Facebook and MySpace.

Ultimately, RIDOT created a six-part project documentary podcast that included maps, renderings, and historical images, as well as video and still footage shot throughout the Iway's construction (see Table 1). The series is available for download from RIDOT's website as well as via YouTube, iTunes, and Blinkx. The podcasts include computer-generated models that display a virtual overview of the completed project, outlining traffic patterns, safety enhancements, the new entrance to India Point Park, and the opening up of new downtown waterfront real estate for redevelopment.

Table 1. Iway Podcasts.

Podcast Title	Description
Iway Project Overview	Provides an overview of project goals and design
Building a Better Highway	Provides an overview of how the route for the new highway was chosen and how the bridge was designed and engineered
Bridge Design and Construction	Provides an overview of bridge design and construction
Iway Bridge Float	Details how the bridge was moved from Quonset Point to its final destination in Providence
New India Point Park	Details how construction of the Iway will expand and enhance India Point Park
A Revitalized Waterfront	Describes how construction of the Iway will result in an improved waterfront in Downtown Providence

The podcast series has been translated into Spanish to expand the reach of the documentary to a wider group of listeners. RIDOT communications staff members perceive a generational divide between users of 2.0 and traditional media sources, and the agency anticipated that the podcasts would enable the agency to reach a younger audience.

The video podcasts themselves required very little additional material or investment to develop. Repurposing prior work, images, and visualizations—all products of the environmental review process—

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[40] RIDOT's website: www.dot.state.ri.us/
[41] Examples of RIDOT's video podcasts are available at www.dot.state.ri.us/engineering/construction/projects/195relo/podcasts/index.asp

allowed the agency to extend the reach of these educational materials and guide the public through the ongoing construction and redevelopment process (see Figure 6).

Figure 6. RIDOT's Iway Project Overview Podcast on YouTube.

RIDOT reported that the video podcasts have improved the agency's ability to disseminate information directly to the general public as well as to traditional media outlets. Moreover, podcasts are viewed as a way to simplify complex project components for general public understanding.

RIDOT Communication through Other Social Media

Building on the success of the Iway podcasts, measured internally by anecdotal evidence, RIDOT publicly launched Twitter, Facebook, MySpace, and Blogger applications in January 2009. The agency felt that these sites would allow better dissemination of press releases, traffic alerts, and other important messages to motorists.

RIDOT's use of social media applications complements use of traditional media sources. The information posted on the social media sites generally comes from traditional press releases and department publications.

Aside from the initial press releases announcing the introduction of social media applications and the inclusion of social media links on the department website, the agency does not explicitly advertise the applications. However, the *Providence Journal* helps drive viewership by including links to RIDOT's social media sites in articles about RIDOT or its work.

RIDOT initially had concerns that launching these social media sites would open the agency up for unbridled public criticism. However, one year into using these sites, the agency reports no negative postings and similarly notes that it has heard of very few excessively negative posts comments on other agencies' sites. RIDOT public relations staff note that people seem to be coming to these sites looking for quick information, not as a place to vent frustrations.

Administrative and Technical Approach

Six staff members in the public relations office manage and monitor RIDOT's 2.0 applications. No new staff members were hired to manage any of the additional workload associated with 2.0 application use. In fact, due to an agency hiring freeze, the number of public relations office staff responsible for managing the applications has been reduced over the past year.

RIDOT has not developed a formal policy to govern its staff's use of 2.0 sites or the monitoring and review of comments the public makes. However, new content posted to the agency's 2.0 applications undergoes the same review process as press releases before being posted. The review process is intended to maintain the quality control standards set prior to the adoption of 2.0 applications. While RIDOT's Twitter and Facebook posts are more informal and informational, mostly providing traffic and weather updates, the formal review process is maintained.
Furthermore, due to concerns regarding the agency's ability to regulate public feedback through the blog platform, comments are not accepted on the RIDOT blog. Users are directed to submit their questions and concerns to the public relations office via email or telephone. To date, the agency believes that most applications have "self-regulated." Most people appear to use the applications to obtain information rather than comment positively or negatively on the agency's performance.

Next Steps

The agency intends to continue expanding its use of 2.0 applications. For example, RIDOT is evaluating what role virtual public meetings could play in the future. These virtual meetings would complement traditional, face-to-face meetings while affording the public more opportunities to become actively engaged in the transportation planning process. RIDOT is conducting preliminary research to evaluate how such an application could work through the existing agency website or a similar portal. In the future, RIDOT would also like to expand its Twitter services by creating multiple, specialized accounts for individual roadways and projects.

To remain current with technology, the public relations office is actively involved with the AASHTO Public Relations Working Group. The working group allows RIDOT officials to exchange ideas and experiences with other state officials across the nation. The staff also regularly follows a number of websites, blogs, and publications dedicated to technology and 2.0 applications.

Lessons Learned

RIDOT reported several lessons learned from its use of 2.0 tools:

- *Use of 2.0 applications expands staff ability to communicate with public.* With a DOT hiring freeze in place and limited staff, RIDOT's public relations office has used social media applications to expand current staff's ability to communicate with a broader audience. Additionally, RIDOT perceives that by duplicating the existing information through multiple 2.0 platforms, the agency can reach broader audiences without burdening staff.

- *Concerns regarding open public comment and criticism have not been realized*. Initial fears and concerns about public posting of derogatory or inappropriate comments have gone unfounded to date. As a result, use of 2.0 applications at RIDOT has expanded.

- *It is important to manage expectations for initial public response toward social media applications*. RIDOT reported that use of social media sites might grow slowly and, initially, there might not be many "fans" or "followers." A small initial audience should be expected as users take time to find and adapt to new sites. However, even if it takes time to reach audiences in new ways, these sites can still help to communicate with segments of the population that might not have been previously engaged.

- ***It is important to periodically review application effectiveness.*** By requiring a preliminary, 1-year "pilot test" period for all new 2.0 applications, RIDOT has established an agency standard protocol for managing future technological advances. The 1-year timetable allows RIDOT time to test the effectiveness of the tool while ensuring the ability of different social media applications to achieve agency goals.

- ***Social media applications can support agency communication with new demographic groups.*** Through use of social media tools—many of which are already familiar to younger users—RIDOT believes it is able to establish new lines of communications with younger demographic groups. In RIDOT's view, younger audiences might prefer receiving on-demand information directly from the source rather than through traditional media.

Resources

RIDOT's blog: ridotnews.blogspot.com

RIDOT's Facebook page: www.facebook.com/group.php?gid=21369549989

RIDOT's MySpace page: www.myspace.com/ridotnews

RIDOT's Twitter page, *RIDOT News*: twitter.com/RIDOTNews

Texas DOT Case

Background

Prior to 2008, the Texas Department of Transportation (TxDOT) relied on traditional media sources, such as newspapers and local television, to share information with the public. However, managing the large volume of public requests for information using only these means of communication was proving to be increasingly difficult, and the agency began limited use of social media applications in 2008. In 2009, when the Texas legislature's "Sunset Review"—a mandatory evaluation conducted every 12 years to identify and eliminate inefficiencies in state agencies—concluded that TxDOT was not sufficiently engaging in meaningful public involvement efforts, TxDOT decided to use 2.0 applications more completely. Specifically, the communications team within TxDOT and TxDOT leadership identified uses of podcasts, Facebook, Twitter, and YouTube as strategies to establish more direct interaction with the public.

Subsequently, TxDOT assembled a 2.0 taskforce. The 12-member taskforce, composed of communications, legal, and information technology staff, was responsible for monitoring initial use of the social media sites and communicating feedback to internal leadership. Several months after a "soft release" of the 2.0 sites—which coordinated internal use and ensured that staff were familiar with applications' functions—TxDOT issued a press release announcing implementation of its 2.0 tools. While the taskforce has implemented 2.0 tools gradually over the last two years, initial response from the public has been positive, helping to encourage continued TxDOT leadership support. TxDOT now advertises all of its 2.0 tools on its website and in staff members' email signatures.

Purpose and Goals for TxDOT's 2.0 Applications

Currently, TxDOT is using 2.0 applications to help meet several general objectives, such as supporting public engagement in transportation, improving agency responsiveness to public feedback, and expanding public awareness about the agency's mission.

TxDOT operates several general, agency-wide 2.0 applications, including Facebook, Twitter, and YouTube. In addition, TxDOT's 25 District Offices are encouraged to use 2.0 applications, for example, by operating independent Twitter accounts (see Figure 7).

These separate accounts allow the agency to provide targeted, region-specific information to the public rather than only on a statewide level.

Figure 7. TxDOT-Houston District's Twitter Account.

Administrative and Technical Approach

To ensure consistency with department goals and messages, TxDOT's District Offices must first obtain permission from the department's headquarters before opening any 2.0 account. District Offices are also encouraged to send content for YouTube and Facebook to TxDOT headquarters for posting to the statewide TxDOT sites.

Three staff members of the media relations office are responsible for statewide 2.0 management. These employees—all of whom work in the department's public relations group—have the capability to add content to TxDOT's 2.0 sites and grant or deny permission for TxDOT District Offices to operate their own 2.0 sites. Other TxDOT employees can send ideas, media, or images to the public relations staff for posting on the sites but do not have direct access to view or update the 2.0 sites.

TxDOT's public relations staff monitor incoming comments on each of the 2.0 sites and have not had to remove any comments to date. While some users do provide negative feedback and express concerns, these comments have not been inappropriate or derogatory. The TxDOT media relations team generally responds to negative comments by identifying concrete issues that the agency might be able to address or providing more details to the user on the agency's action or decision on particular issues. TxDOT staff noted that each of the individual applications has independent terms and conditions with which users must comply. Application administrators have the authority to punish users who violate these terms and conditions and/or suspend their account. While TxDOT staff realizes 2.0 applications are a good way to get conversations started, they do not encourage the public to use the applications to engage in online debates. Comments, both negative and positive, will be addressed; however, users with extensive concerns are encouraged to file formal complaints to TxDOT via email or telephone.

No new staff was hired to manage the additional workload associated with implementation or maintenance of the 2.0 applications. TxDOT staff estimated that approximately two hours of staff time per week is required to add and monitor content. More staff time was required during the planning and implementation stages, as staff familiarized themselves with the different platforms, developed material, and set up the pages. Additional staff time is also occasionally required to develop user policies, resolve legal and technical issues, and communicate technical developments with agency staff, leadership, and stakeholders. Overall, the agency believes that the use of the applications has provided both time and cost savings through more efficient resource allocation and reduced media inquiries.

TxDOT's 2.0 applications supplement use of traditional media sources; similar information is provided via traditional sources and through Facebook, Twitter, YouTube, and/or podcasts. This decision was based on an interest to ensure the media had appropriate materials, such as photos or video, and to make sure the public had access to the information even if the media did not cover the story. The core goal is always to communicate important agency-related information to the public.

Evaluation

Several criteria are used to evaluate 2.0 tools. Initially, TxDOT set performance measures based on the number of fans or followers on each site at particular points in time; the agency then shifted to more qualitative evaluation criteria such as the quality of conversation and public interaction supported by the tool. For example, on Facebook and Twitter, the quality conversations and the number of "retweets" now serve as the respective benchmarks of success. These qualitative measures are more appropriate for evaluating the agency's goal of establishing a dialogue and engaging with the public on transportation issues than simpler measures of the number of visitors or postings.

TxDOT continues to see steady growth in use of each of the applications. Approximately 20 new users per week begin following TxDOT's Twitter account, and approximately five users per week become TxDOT "fans" on Facebook. TxDOT views this growth as another measure of the applications' success.

Anticipated Next Steps

TxDOT is currently developing formal procedures and policies to address use of 2.0 tools. For example, the agency is evaluating appropriate methods for archiving information from social media platforms, determining a procedure for handling complaints received through social media and identifying the appropriate TxDOT personnel to use and manage social media.

TxDOT is considering the use of mobile device applications to meet customer desire for on-the-go information.

Lessons Learned

- ***2.0 tools provide venues for more effective communication.*** TxDOT believes that its 2.0 applications are helping the agency engage in meaningful dialogue with the public. Public inquiries are shifting from phone calls to posts on these sites. When they occur via 2.0 applications, these discussions are available for any customer or interested party to comment on or review. Additionally, online posts are drawing media attention to the issues TxDOT wishes to highlight.

- ***Negative comments have not posed a problem.*** TxDOT monitors its 2.0 sites for negative comments but so far has not encountered any that have been excessive. When someone posts a concern, TxDOT replies either with concrete information or the steps the agency will take to respond to the concern.

- ***Regional Twitter feeds provide more local information to the public.*** District Offices are encouraged to launch their own Twitter accounts (although they are asked to coordinate these sites at the statewide level). These District Office-led Twitter feeds provide residents with localized information.

- ***It is important to look at both the quantity and quality of interaction on the sites.*** Beyond measuring Facebook fans and Twitter followers, TxDOT now looks at how many quality conversations are facilitated by these tools and how many of its messages are retweeted. These metrics capture whether the agency is facilitating a rich conversation with the public through use of 2.0 sites.

Resources

TxDOT's Facebook page: www.facebook.com/pages/Austin-TX/Texas-Department-of-Transportation/44520755873

TxDOT's podcasts: www.keeptexasmoving.com/index.php/podcast

TxDOT's Twitter page: txdot.gov/news/twitter_feeds.htm

Example of TxDOT YouTube video: www.youtube.com/watch?v=AA4b-TI8M0M

Washington DOT Case

Background

In November 2006, a major snowstorm occurred during an evening commute in Seattle, Washington, leading to severe congestion and traffic issues in the city during and immediately after the storm. To help address public concern regarding these issues, the Washington Secretary of Transportation tasked the Washington DOT (WSDOT) communications team with creating forums for the public to express feedback and for WSDOT to respond with comments.

To engage the public in a discussion of the snowstorm and related traffic issues, the WSDOT communications team turned to 2.0 applications, beginning with a blog. The first blog post[42] received 75 comments and was titled *The Big November Storm - How Did We Do?* (see Figure 8). The post and comments indicated WSDOT's intentions to support public conversation about the storm and the public's willingness to engage in the conversation.

Figure 8. WSDOT's Blog.

The blog's success led WSDOT to implement additional 2.0 applications, including YouTube, Slideshare, Twitter, Facebook ,and Flickr. WSDOT views these applications as extensions of traditional information dissemination mechanisms (e.g., press releases). These applications are also viewed as tools to enhance public relations and provide information regarding emergency events, transportation projects, and travel conditions.

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[42] Available at wsdotblog.blogspot.com/2006/11/big-november-storm-how-did-we-do.html

Management Approach and Site Policies

WSDOT's central communications office staff maintain and update site content and respond to public comments. These staff members coordinate their work internally through a daily team telephone call. WSDOT staff in regional division offices can also post to the agency's Flickr account, helping to streamline postings soon after public meetings and other events occur. Overall, upper management has been very supportive of the use of 2.0 tools. Much of that support has been reinforced by positive feedback from the public and positive coverage in the media regarding use of these tools.

WSDOT has developed some unique structures for disseminating agency news through social media sites. For example, a regional WSDOT Public Information Officer, who is located in northwestern Washington, posts agency information using a personal Twitter account.[43] A large number of users follow this account and consider it a trusted source of information for that area. WSDOT believes that the this account's success stems from the fact that most of its followers live in an area where there is very little media presence.

While WSDOT does not currently operate 2.0 applications explicitly for internal use, WSDOT staff can access many 2.0 applications from their workstations. The agency has not generated its own 2.0 policy because the state's de minimis rule[44] regarding brief and occasional personal use of state agency resources covers the use of 2.0 sites on state computers. WSDOT did, however, develop a formal comment policy proscribing derogatory or inappropriate comments, which has generally been effective for managing online communication.[45] Nevertheless, the agency noted that each 2.0 application or tool has its own culture. More negative comments are received via YouTube than any other 2.0 application. When an inappropriate comment is posted from a legitimate user, staff attempt to contact that user and request that the comment be rewritten to comply with WSDOT's comment policy.

WSDOT terminated use of several 2.0 applications that were believed to be ineffective. For example, WSDOT briefly used podcasts as an information dissemination tool but discontinued the effort due to low visitation to the podcast website and the limited amount of public feedback received. Communication staff also implemented FriendFeed, a website that allows users to collaborate and share web content with others, but later discontinued use of this site as there were few users and limited return on investment. The agency explored use of wikis to facilitate internal collaboration but has not yet used this technology because of the amount of resources that WSDOT anticipates will be needed to manage the wikis.

To advertise the use of 2.0 applications, the agency circulated press releases and emails to the public and contains site hyperlinks in most employees' email signatures to alert readers about the tools. Local newspapers have written several articles on WSDOT's 2.0 sites, but WSDOT relies primarily on users' word of mouth. The agency believes that the single largest factor contributing to use of the applications has been inclement weather, which encourages users to access the sites to obtain information on travel conditions, road closures, or related issues.

Evaluation

The agency uses qualitative and quantitative metrics as well as analytics software to follow data trends and use of the 2.0 applications. Qualitative metrics include assessing comments to better understand whether the public has positive perceptions of the agency. Quantitative metrics used to evaluate the sites include the number of followers associated with each of the applications and the length of time visitors spend on the agency sites, as well as the frequency and extent of public feedback. Analytic tools, such as YouTube Insight, are also used to provide data on user demographics. However, WSDOT notes that it

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[43] Available at twitter.com/terpening
[44] Use of state resources cited in the Washington Administrative Code 292-110-010(3). Available at apps.leg.wa.gov/WAC/default.aspx?cite=292-110-010
[45] The comment policy is available at wsdot.wa.gov/Policy/blog.htm

can be difficult to validate information provided through analytic tools as they often reflect users' self-reported data.

WSDOT believes that the amount of public feedback on a site can help increase the number of followers, since users might be more likely to access a site that is perceived to be widely and frequently read. In fact, the number of users accessing WSDOT's 2.0 applications is typically related to the frequency with which the agency adds new content and responds to users' comments. In general, WSDOT found that more users will access the sites when the sites are updated on a more frequent basis.

WSDOT staff offered several examples to demonstrate some of the benefits and successes provided by use of 2.0 tools:

- A user who frequently contributed negative comments to the WSDOT blog expressed more positive comments about the agency after WSDOT used the blog to address his concerns.

- An agency blog post about the Amtrak *Cascades* project (that involves railroad track upgrades, extended service, and other enhancements) resulted in 161 public comments on the blog.

- A picture of a "snow donut"[46] along a WSDOT road taken by a WSDOT employee was posted on Flickr.[47] The picture and story became very popular with the public[48] and appeared on the front page of an international newspaper.[49] The press that resulted from these postings allowed opportunities for WSDOT to showcase their employees' daily work. Local media continue to display WSDOT's Flickr photos on websites and use them for news stories if a photographer cannot come to the area.

- WSDOT received AASHTO's Francis B. Francois Award for Innovation for use of 2.0 tools to reach audiences.[50] The award recognizes innovation in transportation and communication with the public.

Lessons Learned

WSDOT reported several lessons learned from its use of 2.0 tools:

- ***Avoid reliance on automated feeds as a public communication tool.*** WSDOT found that its customers were most interested in conversing with the agency or receiving information that was part of a broader dialogue. WSDOT believes that automated feeds do not sufficiently engage the public in conversation. It is important to consider use of a wide variety of 2.0 tools to supplement feeds and provide opportunities for dialogue.

- ***Use publicly available applications.*** The 2.0 tools that are not hosted by the agency offer many benefits at little or no cost. For example, rather than purchase a new video server to allow users to embed WSDOT videos into their sites, WSDOT began using YouTube, which allowed the agency to more quickly and cheaply share videos. Use of off-site servers to host WSDOT content has also allowed the agency to maintain continuity of operations during emergency situations when traffic overwhelms the WSDOT website.

- ***People appreciate being heard.*** Users commenting on WSDOT's 2.0 sites often express appreciation when WSDOT directly addresses their concerns and questions. Even if a response

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[46] A snow donut is a rare, naturally occurring phenomenon that results when densely packed snow slides down an incline, rolling up into a 'pinwheel' or donut shape.
[47] See www.flickr.com/photos/wsdot/464413289
[48] See seattletimes.nwsource.com/html/localnews/2003622603_donut17m.html
[49] See www.thesun.co.uk/sol/homepage/news/article22985.ece
[50] See www.transportation1.org/awards/francois.html

does not immediately resolve the issue, WSDOT found that people generally appreciate knowing that the agency is listening to their concerns and taking their input into consideration.

- ***Become familiar with the "culture" of each 2.0 application to ensure that they are being effectively used.*** Each 2.0 application has different communication norms and user expectations. Understanding these expectations and tailoring agency communications to appropriately fit each site's "culture" can help increase readership and ensure that the sites are meeting customers' needs.

- ***It is important to educate leadership on the value of 2.0 tools.*** While communications staff might be able to take the lead on implementing, managing, and monitoring 2.0 applications, agency leadership must understand the value of the tools in order to support their use. To help educate leadership on the benefits of the tools, communications staff can, for example, share examples of best practices or success stories.

Next Steps

WSDOT intends to expand its use of 2.0 applications in the future as technology continues to evolve and develop. The agency has also experimented with live broadcasts of public meetings; these broadcasts contained streamlining audio and video as well as chat features that allowed real-time public input and feedback. The success of these broadcasts illustrated some possible new avenues for the agency to explore.

The agency also intends to work collaboratively with the WSDOT Chief Information Officer and Secretary to develop new 2.0 applications for internal use and external information dissemination. WSDOT also plans to move towards the mobile arena by creating mobile applications that allow the public to make more informed decisions about travel conditions.

Resources

WSDOT's blog: wsdotblog.blogspot.com/

WSDOT's Flickr page: www.flickr.com/photos/wsdot/

WSDOT's Facebook page: bit.ly/9pVo5z

WSDOT's Slideshare page: www.slideshare.net/wsdot

WSDOT's Twitter page: twitter.com/WsDOT – WSDOT also maintains Twitter pages for specific interests, such as operations, traffic, and current news.

WSDOT's YouTube page: www.youtube.com/user/wsdot

APPENDIX A. INTERVIEWEES' CONTACT INFORMATION.

Agency	Participant(s) Name	Contact Information
MassDOT	Joshua Robin Christopher Dempsey	joshua.robin@state.ma.us 617.973.8876 christopher.dempsey@state.ma.us 617-973-7963
MDOT	Carrie Adams Susan King	cadams@mdot.state.ms.us 601-359-7017 sdking@mdot.state.ms.us 601-359-9791
MoDOT	Charles "Matt" Hiebert Laura Holloway	charles.hiebert@modot.mo.gov 573-526-0897 laura.holloway@modot.mo.gov 573-751-5985
NCDOT	James Merricks	jmerricks@ncdot.gov 919-707-2207
RIDOT	Dana Alexander Nolfe	dnolfe@dot.ri.gov 401-222-1362 x4450
TxDOT	Kelli Petras	kpetras@dot.state.tx.us 512-936-1906
WSDOT	Jeremy Bertrand Lloyd Brown	bertraj@wsdot.wa.gov 360-705-7872 brownl@wsdot.wa.gov 360-705-7076

APPENDIX B. OVERVIEW OF SELECT 2.0 TOOLS CURRENTLY AT STATE DOTS.

State DOT	Twitter	RSS Feed	Facebook	YouTube	Blog	Mashups	Flickr	Podcasts	Friend Feed	XML Feed	MySpace	Widgets	Wiki
Alabama													
Alaska													
Arizona				X	X			X					
Arkansas	X	X											
California	X	X	X		X				X				
Colorado	X		X	X						X			
Connecticut													
Delaware	X	X		X		X	X						
District of Columbia	X		X	X									
Florida													
Georgia	X			X									
Hawaii													
Idaho	X			X		X							
Illinois	X		X			X							
Indiana													
Iowa	X	X	X	X									
Kansas													
Kentucky	X	X											
Louisiana			X										
Maine													
Maryland													
Massachusetts	X	X		X	X	X	X						
Michigan	X	X	X										
Minnesota	X		X										
Mississippi	X												
Missouri	X	X	X	X	X	X	X	X				X	X
Montana	X	X											
Nebraska	X												
Nevada													
New Hampshire													

State DOT	Application												
	Twitter	RSS Feed	Facebook	YouTube	Blog	Mashups	Flickr	Podcasts	Friend Feed	XML Feed	MySpace	Widgets	Wiki
New Jersey													
New Mexico													
New York		X											
North Carolina	X	X	X	X		X	X						
North Dakota			X										
Ohio		X				X							
Oklahoma	X												
Oregon			X										
Pennsylvania													
Puerto Rico													
Rhode Island	X		X	X	X			X				X	
South Carolina													
South Dakota													
Tennessee	X	X	X										
Texas	X		X	X				X					
Utah	X												
Vermont													
Virginia	X			X									
Virgin Islands													
Washington	X	X	X	X	X		X						
West Virginia		X											
Wisconsin													
Wyoming													

APPENDIX C. WEBSITES FOR 2.0 TOOL EXAMPLES.

2.0 Tool	2.0 Tool Example	Website
Wikis	Wikipedia	www.wikipedia.org
	Wiki on Institute of Transportation Engineers' Pedestrian and Bicycle Council	www.ite.org/councils/Ped_Bike/
	Livable Streets wiki	www.livablestreets.com/streetswiki/
Social media	Facebook	www.facebook.com
	MySpace	www.myspace.com
Mashups	Bikewise	www.bikewise.org
	GoogleTransit	www.google.com/intl/en/landing/transit/#mdy
Podcasts	White House podcasts	www.whitehouse.gov/podcast/audio/weekly-addresses/rss.xml
Media-sharing sites	YouTube	www.youtube.com
	Flickr	www.flickr.com
	Slideshare	www.slideshare.com
RSS feeds	USDOT RSS feeds	service.govdelivery.com/service/rss/item_updates.rss?code=USDOT_38
Blogs	*FastLane*, USDOT blog	fastlane.dot.gov
Micro-blogging services	Twitter	www.twitter.com
Interactive surveys	Cyclopath	cyclopath.org
	WalkScore	www.walkscore.com
	Zoomerang	www.zoomerang.com
Shared documents	Google documents	docs.google.com
Virtual meetings, meeting-sharing tools	Slideshare	www.slideshare.com
	City of Kalamazoo, Michigan Virtual Master Plan Public Meeting	bit.ly/bkB3ya
Professional networking sites	LinkedIn	www.linkedin.com
Virtual worlds	Second Life	www.secondlife.com
Bookmarking sites	Delicious	www.del.icio.us.com
Cloud-based computing	Google documents/groups	www.groups.google.com
Crowd sourcing	Next Stop Design	first.nextstopdesign.com
Simulation games	Mobility: A City in Motion	www.mobility-online.de/en/informations/generalinformation.html
	University of Minnesota Gridlock Buster	www.its.umn.edu/GridlockBuster/