Web 2.0 Applications for Collaborative Transport Planning

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1 ABSTRACT

Web 2.0, shorthand for Internet applications that rely on users to generate content and information, has the potential to significantly improve transport systems and operations. However, Web 2.0 applications are not being introduced as quickly in the transportation planning process as in other sectors. The goal of this paper is to encourage greater use of Web 2.0 applications in the transport planning process. The paper begins with an introduction to Web 2.0 and identifies four categories of applications. Next it describes each of these categories and provides transport-related examples. Finally it presents recommendations for developing Web 2.0 applications designed to improve public participation in the planning process and describes a conceptual Web 2.0 application designed to improve public transport operations.

2 INTRODUCTION

2.1 Overview

The Internet has revolutionized the world. It has changed the way people work, socialize, shop, and travel; it has changed the way companies operate, where they locate and how they manage production; it has changed the way government provides services, how we communicate with government and how we influence public policy.

This paper argues that, while most transportation organizations have entered the Internet age, many are barely scratching the surface of the Internet's potential. Almost all transport organizations use the Internet to disseminate information (e.g. public transport schedules), many use the Internet to collect feedback and as part of public involvement programs, but there are very few who use Web 2.0 applications effectively to engage the public in a collaborative process designed to improve planning, construction and operation of transport systems.

The goal of this paper is to introduce some key Web 2.0 concepts and outline how these concepts could be used to improve transportation systems and operations. Web 2.0 refers to Internet applications in which users (help) develop content and/or perform activities. Examples include Wikipedia, blogging, and Facebook.

The rest of this chapter presents a structure for categorizing Web 2.0 applications. Chapters 3 through 6 describe these four categories of Web 2.0 application and provide transportation-related examples. Chapter 7 presents recommendations for creating Web 2.0 applications to improve transportation systems and a conceptual Web 2.0 application that could be used to improve public transport operations. A longer version of this paper is available at: http://www.andynash.com/projects/web2transport.html

2.2 Categorizing Web 2.0 Applications

In order to provide a structure for understanding the key types of Web 2.0 applications this paper classifies applications into one of the following four categories:

- Information Provision – these applications are designed to provide information. A common transport application is public transport schedule information.

- Planning and Administrative Process – these applications are designed to enable users to complete a task, for example provide specific information to a government agency.

- Social Networking – these applications allow users to create interest groups, share information and 'meet' like-minded people. Common applications include Facebook and LinkedIn.

- Analysis and Evaluation – these applications enable users to use website based tools to analyze data. Common applications include 'cloud-based' applications such as Google Documents.

However, it must be emphasized that most specific Web 2.0 applications combine these categories by, for example, including both social networking and information provision in a single application. The following chapters describe each of the categories in more detail and present transport related examples.

3 INFORMATION PROVISION APPLICATIONS

Information provision applications are designed to communicate information to their users. In Web 2.0, third parties can add information to an organization's website and/or application developers can use data made available on the Internet to create their own informational websites. This section describes three main types of Web 2.0 information applications: wikis, personal information sharing, and mash-ups.

3.1 Wikis

A wiki is a website that provides special tools enabling anyone to edit the website pages and to create new pages. The word wiki comes from the Hawaiian word wiki (quick), which was used in the initial wiki-based applications. [1] The most familiar Web 2.0 wiki application is Wikipedia, the open source on-line encyclopedia.

The idea behind wikis is that "crowd sourcing" (i.e. the idea that everyone together knows more than one person alone – even if that person is an expert) can provide accurate information.

There are problems with the open approach used in wikis. For example popular Wikipedia pages have been "hijacked" for political purposes. Therefore most wikis now have a series of safeguards including 'moderators' responsible for helping control the information.

In terms of results, the information quality in Wikipedia is similar to traditional encyclopedias (e.g. Encyclopedia Britannica), but the amount, breadth and accessibility of Wikipedia information is much higher. The Wikipedia story is a fascinating example of development of new socio-technical systems. [2]

3.2 Personal information sharing: Blogs, YouTube, Photo Sharing, Twitter

The second category of Web 2.0 information provision websites are applications that enable users to create their own personal platforms for providing information. These applications allow users to create websites and share various types of media – with practically no limitations. The most important examples are Blogs (applications that enable anyone to create webpages), video sharing sites like YouTube and photo sharing sites like Flickr.

The latest development in the field of personal information sharing is Twitter. Twitter uses short message system (SMS) technology to broadcast 140 character messages from people to websites and directly to other users who 'follow' the broadcaster. Other users can also see messages related to a specific subject by entering the subject in a search box. Messages can be sent and read via the Internet or using mobile telephones. Twitter is growing rapidly and has developed an interesting series of web pages that describe how it can be used in business. [3]

All these personal information applications have tools that enable other users to comment and add information (a must for Web 2.0 applications), so they are a two-way street. The applications also provide tools enabling users to find related information, link to other websites and rate the quality of information (which helps provide some order in the system).

The applications also are designed to enable easily linking user-generated information between applications: for example embedding YouTube videos on your blog or adding links to favorite websites or creating Really Simple Syndication (RSS) feeds of your blog. It is also possible to use features like Google Maps to geographically tag (i.e. locate) information. All these features are (relatively) easy to use and are provided for free (at least for now).

Finally, it is important to note that companies and organizations are now using these Web 2.0 information applications to promote their views. In fact, smart companies have embraced the idea of Web 2.0 and are using these applications to improve their products and services. [4] The best approach is to think of developing Web 2.0 applications as you would starting a business, namely aim to be the best in your field. [5]

3.3 Mash-ups

A third type of Web 2.0 information provision application is a "mash-up". A "mash-up" is an application that combines information from several sources to create some new information. Most of the information used in

a mash-up application comes from data made available on the Internet and often mash-ups are created by developers from outside the data-providing organization.

For example, an independent application developer might combine data from BART with data from a business locations database to map the closest coffee shops to all BART stations on Google Maps. (Or Starbucks might map all its stores and include special information about each store.) These examples show the importance of data access for mash-ups.

Some government agencies have been very innovative in the providing data for mash-up applications. Great Britain initiated a program called Show Us a Better Way (www.showusabetterway.com) in which people described the application they wanted to develop and the data they needed to create it. In Washington DC, the Apps for Democracy (http://www.appsfordemocracy.org/) program held a similar competition to identify the best 3rd party applications that could be developed using public data (the city offers a data feed of almost all the data collected: over 400 different data sets). It is interesting to note that many of the applications developed in both the Show Us a Better Way and Apps for Democracy programs were transport related.

4   PLANNING AND ADMINISTRATIVE PROCESS APPLICATIONS

Planning and administrative process applications are designed to enable users to "help" the application owner complete a specific task.

In Web 1.0, users could provide input to processes by sending e-mail or filling out comment forms. Another approach was completing government forms on-line using applications including Adobe Acrobat. Many of these systems are not very creative, simply mimicking the traditional paper-based planning process, which shows that there is room for innovation.

Web 2.0 applications ask users to provide more detailed information and actually process this information to complete a task. Many of these applications fall under the general term "crowd sourced" meaning that the information they provide comes from many independent people acting together.

The best way to understand these applications is to describe examples of how they are being used, therefore the following sections outline several types of planning and administrative applications and present examples of transportation related sites.

4.1 SeeClickFix – Crowd sourced problem identification

SeeClickFix (http://www.seeclickfix.com) is a Web 2.0 application that enables people to identify non-emergency issues (e.g. potholes), describe them in detail (e.g. include photos) and place them on a map (from Google Maps). Once the issues are identified and placed on the map, other users can 'vote' for the issue (i.e. give their opinion on how serious the issue is) and add more information. The application's goal is to attract attention from the responsible public agency, which would then address (fix) the issue.

4.2 Cyclopath: Crowd-sourced Recommendations

One of the most common Web 2.0 applications are websites that encourage users to provide recommendations. For example rating restaurants or videos. Furthermore, incorporating the ability to rate information quality is fast becoming an important tool for all types of Web 2.0 applications (e.g. Amazon's star system). According to Noveck, many organizations are using bubble-up techniques like rating to improve the quality of information they collect and make available. [6]

An interesting transportation application of crowd sourced recommendations is Cyclopath. Cyclopath was developed by the University of Minnesota to help users "Find bike routes that match the way you ride." According to their website, "Cyclopath lets you enter personal bikeability ratings for roads and trails. This unique rating system helps find the best routes for you, while also supporting the community with your individual knowledge.

Cyclopath is a geowiki: an editable map where anyone can share notes about roads and trails, enter tags about special locations, and fix map problems - like missing trails. Hundreds of Twin Cities cyclists are already doing this, making Cylopath the most comprehensive and up-to-date bicycle information resource in the world." (www.cyclopath.org) [7]

4.3 Crowd-sourced planning applications

A third type of planning and administrative process application are websites that enable people to assist in the process of actually preparing a plan. There are two basic approaches: providing tools to help improve the input process, and providing tools that enable users to actually participate in the "plan writing" process.

The first approach, facilitating public input, uses Web 2.0 tools to extend many traditional ideas for obtaining public input into the Internet age. This is not a trivial achievement since Web 2.0 tools enable a much broader participation in the fullest sense. There are two key advantages: first, the tools are available for everyone who has Internet access; and second, they give planners the ability to collect and analyze detailed information from many people. The main problem is ensuring Internet access for all, but there are solutions for this problem including public library access etc. Finally, as outlined below in the recommendations, websites must be very carefully designed to encourage participation (using strategies like incentives, easy to use interfaces, breaking work into small segments, etc.) and to make the information gathered useful for planners.

A good example is San Jose's Wiki Planning Project. San Jose California is using a set of tools called wikiplanning to increase and improve citizen input for development of the city's Envision 2040 general plan project. [8] The Wiki Planning name is somewhat misleading since there is no Wiki per se involved, but rather a series of Web 2.0 applications linked into a convenient package. Wikiplanning's creators call the approach "The Virtual Design Charrette" and describe Wikiplanning as "... an online solution for improving civic engagement, an important component of most urban planning initiatives. ... [9] The site is a good attempt to put several Web 2.0 applications together in a user friendly way to encourage participation in developing this plan. It will be interesting to see how this works out from a practical perspective.

The second approach, tools that enable users to help actually prepare plans, extends the concept of public participation even further. The clearest example is to create the plan using a wiki; anyone could enter information. A good example is the Pittsburgh Regional Integrated Transportation Plan. Here, the crowd is actually writing the plan. A group called Pittsburgh CitiWiki Project has developed a wiki that focuses on improving the quality of life in Western Pennsylvania. CitiWiki is viewed as "an experiment in collaborative creativity conceived and created in the community." (http://www.pghwiki.org/wiki/index) CitiWiki's first project is to draft a crowd-sourced regional transportation plan using a wiki template. As with many of the applications discussed in this paper there is a great deal of idealism involved in the CitiWiki project.

5   SOCIAL NETWORKING APPLICATIONS

Social networking applications are the most familiar Web 2.0 application. The most popular include Facebook, MySpace, LinkedIn and XING. There is even an application called Ning (http://www.ning.com/) that enables people to create their own social networks.

Social networking applications are still in their infancy. It's clear that they are important, but unclear exactly how they can be used most effectively. However, in spite of this problem, social networking is a powerful tool that can improve two-way communications with all types of users and thereby help improve the development and operation of all types of transport systems.

There are three main types of social networking applications: purely social, professional and social networking tools that are provided on application websites designed to create a "community" around the application-specific purpose (e.g. a social network of people contributing to the StreetsWiki website). This chapter describes each type of application using an example site.

5.1 Facebook

Facebook (www.facebook.com) is the most popular social networking application. Facebook was originally designed for truly social connections (i.e. friends, classmates, etc.) but is expanding to include more and more business relationships. It currently has over 300 million members, 70% of whom are from outside the United States. More than 8 billion minutes are spent on Facebook every day and surprisingly, the fastest growing demographic group on Facebook are people over 35-years old. Facebook's growth and impact is impressive especially considering that it did not even exist several years ago.

One key feature of all social networking applications is the ability to join and create groups of people with similar interests. There are "more than" 500 groups found in a search of Facebook groups under the term "Transportation Planning".

It is easy to see how a Facebook group could be used effectively to generate interest in transport planning. However, the group would need to be actively managed and need to have something to generate interest, e.g. a major government planning process or policy issue.

5.2 LinkedIn

LinkedIn (www.linkedin.com) is a professionally-oriented social networking site (another popular example in Europe is Xing). Professionally oriented social networking sites are designed to help users make connections with other professionals with whom they can trade information such as job opportunities, technical data and news. As of February 2010, LinkedIn has over 60 million members in over 200 countries around the world with approximately half the members from outside the U.S. [10]

An important part of professional social networking sites are professional groups. These consist of people who are in the same general profession or have similar interests. Any member can start a group and there are groups (often multiple groups) in almost any profession imaginable (there are also interest groups such as college alumni associations etc.). LinkedIn currently has almost 529,500 groups, the largest has over 235,000 members. Many of the largest groups are human resources professionals and much of the activity in all groups is employment-related. There are currently 927 groups listed under the subject of transportation (February 2010).

It is fairly easy to imagine how professional social networking sites could be used to help in the employment process. On the other hand, the effectiveness of non-employment related information exchange is highly variable depending on the group. As with many organizations often a few people do most of the work starting discussions and posting items. Others participate intermittently.

There are two main problems with using the LinkedIn groups to exchange information. First, there are just too many groups. Participation is scattered. Oddly, even with so many groups, many are not really specialized: there are often several groups on the same subject. Second, most groups do not have enough people willing to help lead and control discussions.

Both these problems rise from the lack of time available to fully participate in activities that are not directly targeted to an individual's specific objectives (e.g. job responsibilities). If groups were more focused on specific areas it might be possible to generate a more constructive dialog and better information exchange.

5.3 Integrated social networking tools

Integrated social networking tools are applications that are included as part of a Web 2.0 Internet website that enable those using the site to create an application-specific social network. In this case the social network is highly focused on the goals and objectives of the specific application. These tools encourage social networking on several different levels – depending on the degree of social networking they are designed to foster.

At the highest level (i.e. in situations where the application developers want to stimulate a great deal of social networking), application developers offer a full suite of tools are designed to faciliate two-way communications and information sharing. A good example is the LivableStreets Initiative Community (part of the Livable Streets Initiative www.livablestreets.com). Currently there are almost 5,200 members of this social network (as of February 2010). The LivableStreets Initiative also compiles blog postings from almost 350 'members' to a website and this community gets involved in discussions on various topics.

At the medium level, application developers include tools that enable users to recommend news articles or websites such as del.icio.us, digg, or StumbleUpon. These websites all allow people to comment on comments made by other users and enable people to 'follow' recommendations made by users they select.

At the lowest level of social networking are subscription tools. Subscription tools enable people to directly receive internet-based information when it is posted. The best analogy is a periodical subscription. Good examples include really simple syndication (RSS) for blogs and 'following' in Twitter. These are classified

as simple in the sense that they are not (necessarily) two-way (I may follow you, but you might not follow me).

The trend is for Web 2.0 Internet websites to use all three types of social networking website tools, thus providing something for any level of social networking engagement that the user desires.

6 ANALYSIS AND EVALUATION APPLICATIONS

Analysis and evaluation applications are applications that enable users to enter data and use website-based tools to evaluate and manipulate that data.

There are many types of Internet websites that fall into this category. They range from very simple websites that, for example, allow you to calculate currency conversions (www.xe.com), to more complicated websites that provide users with business applications like spreadsheets, word processing and presentations as well as the ability to save data and collaborate with others on the same documents (e.g. Google documents).

Websites that provide access to applications and enable users to store and share data are often referred to as "cloud" based computing (the data and analysis tools are stored 'in the cloud' rather than on your computer). The model is software as a service rather than a product that comes wrapped in a package. A huge advantage of cloud-based systems for companies and people working in groups is that everyone is using the same program version and IT maintenance is done centrally – reducing the need for local technical support.

Cloud-based computing can be either free (e.g. Google documents) or subscription-based (e.g. Salesforce.com) in which users pay to use the applications and data storage provided by the application vendor. Salesforce.com is a popular customer relationship management (CRM) application that was among the first companies to embrace the concept of cloud-based computing. Today most subscription-based applications are oriented towards the corporate market, but there is continuing speculation that programs widely used by individuals (e.g. Microsoft Office) will be replaced by cloud-based subscription systems.

In addition to traditional business-oriented applications such as spreadsheets, there is another type of complex analysis and evaluation application on the cloud: games. While games may strike some as trivial, it is argued below that games can, in fact, be a key element in Web 2.0 applications used to improve transport systems and operations.

Games are especially useful since they can attract users and encourage them to participate. For example, some marketers are now using on-line games to analyze and evaluate data. Furthermore, games can serve as a good educational tool. One application that uses games to help understand transport planning is the University of Minnesota's Gridlock Buster game.

6.1 Transport related analysis and evaluation applications

Transport managers and planners can use all types of analysis and evaluation tools that are available on the Internet. These tools could be used, as in other businesses, to replace existing systems, encourage collaboration, increase efficiency and reduce costs. These types of uses fall under the category of general management and therefore will not be further discussed here.

In addition to the general business applications, many transport services already provide analysis and evaluation applications on the Internet, for example public transport schedule and direction finding websites. Many of these direction/schedule websites currently fall in the very simple category (returning a specific result based on the user input) although they are being extended to provide more information (e.g. real time, multimodal, etc.), to accept more varied user inputs, and to be available on more devices.

The San Francisco Bay Area Metropolitan Transportation Commission's transportation information website (www.511.org) is an excellent example of a website that has been continuously improved to include more features and applications (including information on transportation data feeds, 3rd party applications and information about public participation). One shortcoming is that the website does not include real interactive tools to help improve transportation planning.

Another extension of transport applications is their integration with user-provided information, for example driving instructions from Google Maps. These maps can also show user-provided photos, reviews of businesses and comments.

While it is clear that these analysis and evaluation applications can be extended, their main function is providing relatively simple information designed to answer questions from users. The next section describes more complex applications intended to enable users to perform more complex analysis and evaluation tasks.

6.2 Using on-line games to improve transport systems and services

Many people consider computer games to be a waste of time, but there is growing recognition among Web 2.0 application developers that computer games may provide an excellent source of information and could be used to generate creative problem solutions. In this sense it's important to remember that transport simulation programs are essentially games, so maybe the idea that games can be useful is not so far fetched.

In fact, there are already many on-line games that include transportation planning elements (even players of the very popular Worlds of Warcraft on-line game have access to many forms of transport including riding various creatures (mounts), boats, zeppelins and an underground tram, there is even a public transport page). [11]

As mentioned above, some marketers are using computer games to collect information and to create excitement for their products (e.g. games related to new motion pictures). There are also a large number of games designed for educational purposes. There is also a whole series of simulation games for transport system and city building. Finally there are the alternative reality websites which are not really games, but share some game features and can be used to help complete analysis and evaluation tasks.

Since computer games are essentially simulations, it should be possible to extend games so that the players can simulate real-life rather than pretend situations. Alternatively, transport simulation programs could be made simpler so that anyone could use them, or the two could meet in the middle. In fact, according to Wired magazine, Mark Gorton (a key LivableStreets Initiative supporter) is also developing applications for open source citizen based planning (although the article did not give details). [12]

It would be very interesting to develop games based on real transportation simulation models and enable users to use these games with actual data that they collect. This could make everyone a transportation planner just as blogging can make everyone a news reporter. The technology is available. Such a system would totally change the nature of public participation in transport planning process.

This section presents several examples of on-line transport planning games that could serve as models for creating games that analyze real-world transportation systems and help the public identify innovative new ideas.

6.2.1   Gridlock Buster

Gridlock Buster is an online traffic control game developed by the Intelligent Transport Systems Institute at the University of Minnesota's Center for Transport Studies. [13] The game was developed based on standard traffic engineering tools and techniques.

In Gridlock Buster players control traffic and receive feedback based on vehicle delay and the length of queues formed at traffic signals. Players move through different levels of challenges and 'compete' to improve their scores.

Gridlock Buster is designed as a teaching tool to help explain how traffic is controlled on roadway networks. This will be helpful to citizens wanting to learn more about traffic congestion. Furthermore, the website includes an invitation for high school students to visit the ITS Institute labs and learn more about transportation planning. As such it's a great way to attract young people into the profession.

6.2.2   Urban Planning and Transportation Simulation Games

There is a whole category of on-line computer games that allow users to design imaginary cities and transport systems. Perhaps the first was SimCity, which has now grown to include various different games and modules. [14]

6.2.3   Portland Oregon Metro: Build your high capacity system

The Portland Oregon area's regional government, METRO, (http://www.oregonmetro.gov/) developed the "Build your high capacity system" tool to help citizens understand the trade-offs involved in planning high

capacity public transport systems (e.g. budget constraints!). It was developed during preparation of the region's High Capacity Transit System Plan.

According to the Metro website: "The build-a-system tool lets you compare each of the transit corridors being evaluated by the project team. The corridors could, individually or in combination, connect places within the region with high capacity transit. With this tool you can compare how each corridor performs and learn about the benefits and costs of the system you've created." [15]

It is perhaps unfair to consider this a "game" since it falls in a gray area; it's a game in the sense that it is a fun way to learn about an important subject, and it's reality in the sense that it's backed up with real data for a specific area. Furthermore it was used to help Portland develop a plan for improving their public transport system; over 4,200 visited the website (and over 600 answered a survey associated with the page).

The build-a-system tool is a relatively simple application in the sense that users can only choose between specific routes, so it works by simply summing the data on cost, ridership, and environmental benefit in its database for the lines selected by the user to be included in their network. Still, it enables users to compare lines and networks and clearly illustrates the concept of a limited capital budget.

Finally, in true Web 2.0 fashion the site creators have also incorporated outside (3rd party) applications into the website. Users can click on a neighborhood center icon to get a pop-up with tabs for "map" (which displays a Google satellite map) and "info" which has a link to the walkscore website described above. (www.walkscore.com).

7 CONCLUSIONS: CREATING WEB 2.0 APPLICATIONS TO IMPROVE TRANSPORT SYSTEMS AND OPERATIONS

The previous sections describe the fundamental principles used in Web 2.0 and several trailblazing transport related applications. This section presents recommendations for creating Web 2.0 applications that will improve transport system planning and operations.

7.1 Public involvement, the guiding principle

The innovation that differentiates Web 2.0 from early Internet sites is user involvement. The previous chapters have described some of the main types of user involvement including commenting, sharing photos and videos, rating quality and playing games, but the main point is that in Web 2.0 users are involved in the process of creating information.

While the standard public involvement program for transportation planning projects has been significantly improved over the years since these programs were mandated, it is hard for anyone involved in the process to believe that it works well. Here, then, is the opportunity for Web 2.0 applications.

Noveck calls the problem "the single point of failure", specifically, decision-making systems based on the belief that government experts can identify the best solutions to problems. Today the public can become involved in the deliberative part of this process by talking at public meetings etc., but new technology means that they could, in fact, really collaborate in the process of developing the solutions, rather than simply commenting. She emphasizes that citizens have a great deal of expertise that they could contribute to this process, if there was a way. She goes on to describe an application called Peer-to-patent, which enables people to help provide information to the US Patent Office that helps them make decisions. [6]

In summary, the goal is to improve the quality and operation of transport systems by creating collaborative public processes using Web 2.0. While it is possible to establish collaborative public involvement processes without using Web 2.0 applications, these applications make collaboration much easier. The next section presents recommendations for developing these types of applications.

7.2 Recommendations for Web 2.0 transport applications

The most important thing to understand about Web 2.0 is that it will revolutionize your business. Old ways of doing business simply don't work when information is more easily shared.

Some businesses have tried to fight change, for example, record companies suing people for sharing music. Others, like newspapers, are watching as their business models are destroyed. But clever companies are embracing change, building new business models based on using new technologies to build better products

and offer improved services. It's not so different from other technical revolutions, although it's happening faster.

The following recommendations are intended to help those involved with government planning agencies begin thinking about how Web 2.0 applications can help them develop new business models.

- Embrace Web 2.0 – This means making your data easily available to the public, encouraging developers from outside the organization to use your data to create applications, and creating applications that engage the public in a collaborative process designed to improve your business.

- Design counts – good design is needed to attract and keep people using your website.

- Don't reinvent the wheel – There are many attractive, well designed and reliable Web 2.0 applications already available. These applications can be used as is or modified for specific uses.

- Use an integrated approach – An organization's Web 2.0 presence should include all the types of applications needed to achieve its goals. Figure 1 presents a model for an integrated approach to creating a website for collaborative transportation planning.

- Maintenance matters – Almost everyone underestimates the time and effort required to maintain an attractive website.

- Provide free access to information

- Carefully consider information organization – Tools are needed to make organization of information easier and for consistent editing (by users and application developers).

- Obtain sufficient funding
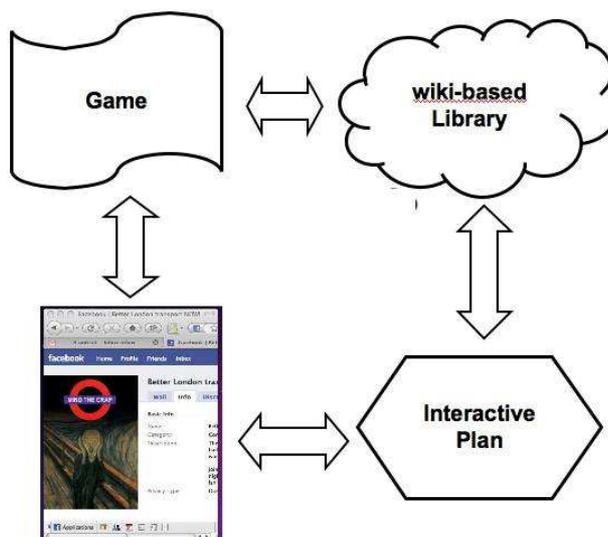
- Provide incentives for participation

Fig. 1: Four element model for collaborative transportation planning website.

The next chapter presents a concept for a website based on these recommendations.

7.3 Improving public transport operations: Bus Meister

This section presents an example Web 2.0 application called Bus Meister. Bus Meister is designed to test the concept of developing an integrated Web 2.0 application that enables citizens to collaborate in the process of improving the operation of buses and trams that run on the street. If the application is successful it could be expanded to include other modes of transport and actual street design.

Bus Meister was developed using many of the principles discussed in this report. It consists of a game allowing players to understand how operating changes can improve public transport service and enabling them to test ideas for improving service on their own routes. The game is based on data from a wiki documenting public transport operations best practices. Finally, Bus Meister helps get good ideas

implemented by providing social networking tools designed to help users generate political support for improvements. [16]

Bus Meister focuses on public transport priority measures. These are cost effective measures designed to increase public transport attractiveness by speeding-up buses, streetcars and trains. Public transport priority measures are excellent ways to improve transport because they are inexpensive and can be implemented quickly. [17] [18]

7.3.1   Research Database

Bus Meister's foundation is a crowd sourced wiki database presenting best practice information on three levels: detailed, technical summary and public summary. At the detailed level, researchers and transport professionals would enter information about their projects (abstract, contacts, links, etc.). The technical summary pages would focus on a specific subject area (e.g. bus stop design), researchers and professionals would edit these pages based on results of their projects.

The public summary pages would describe research in plain language. Moderators would maintain the summary pages and create the initial public summaries. These pages would include links to various media including videos, photos and presentations. As a wiki, all registered users could contribute to the information.

In addition to its educational purpose, the database will improve research quality by providing a single location for information on public transport priority. The wiki format means that the database will be a real-time state-of-the-art summary enabling researchers to identify fruitful areas for research and providing them with an effective dissemination platform (which will provide an incentive for them to participate).

7.3.2   Bus Meister Game

The Bus Meister game allows players to examine the impacts of public transport improvements on their own public transport routes. The game will both teach users about public transport operations and help them assess the value of their ideas.

First players would enter information (e.g. travel time, location of bus lanes, etc.) about their public transport route into the game using an interfaces developed with Web 2.0 applications (e.g. Google Maps). Applications would be developed for smart phones to facilitate this process. Players would collaborate in creating these route maps. As more information is added, the maps will become quite accurate. Progressive government agencies would make route and street data available immediately.

Once route information was on-line, players could test their improvement ideas by dragging improvement widgets on to the route map and the game would estimate the benefits and impacts. For example, the player could add traffic signal priority by dragging the "public transport priority signalization widget" onto the route map at the intersection.

The improvement widgets would be based on the research in the database (e.g. traffic signal priority reduces time spent at traffic signals by 20%). The game would apply data from the widget to the specific route (e.g. buses spend an average of 60 seconds waiting at this intersection) to estimate the benefit and impacts (e.g. on cross traffic).

The description above sounds simple, unfortunately it's not. A complicated transportation simulation model would be needed to accurately evaluate the full impact of an improvement and this is probably too much to expect, at least initially. Therefore, the game will be designed at different levels; the first level would be very simple, focusing only on the change in bus performance. As the application became more sophisticated more detail could be added (e.g. impact on cross traffic). This is not a problem as long as the quality of game results at each level are clearly communicated and understood.

7.3.3   Bus Meister Social Networking Tools

A full suite of social networking tools would be integrated into Bus Meister so that users could create communities to further their goals. Bus Meister would have two main types of users: people interested in making their public transport systems work better and professionals working in public transport (operators and researchers).

The first type of user, people interested in making their public transport work better, will typically be public transport advocates in specific regions. They would use Bus Meister's social networking tools to share information, collaborate on identifying improvements for routes, encourage others to participate by providing feedback on ideas and organize events like contests to develop the most effective measures for a given route.

An important role for these communities is providing feedback to fellow users – many websites fail because no one ever responds to comments. [4] Since it would be impossible for public agencies to respond to all the ideas generated by users, these communities would evaluate ideas and only recommend the best ones for further study.

Finally, these local communities will also generate political support for improving public transport. These communities would be similar to those currently organized around the Livable Streets Initiative and SeeClickFix, but it is also easy to see someone starting a Facebook group dedicated to improving a particular public transport route with information from the latest Bus Meister game evaluations.

The second type of user, transport operators or researchers, will use Bus Meister's social networking tools to improve public transport services and research quality. More specifically, public transport operators could contact researchers with questions, and researchers could ask professionals to evaluate the practicality of research ideas and/or to field test ideas.

Since, the non-professionals will generate totally new ideas for improving public transport. This type of customer-driven innovation is likely to develop innovative ideas that professionals don't see because they are too close to the subject. Bus Meister's social networking tools will also allow these promising ideas to be considered for more detailed study.

7.3.4 Developing and Implementing Bus Meister

Bus Meister is currently a research concept developed by the author of this paper. A more detailed description is available at www.andynash.com/busmeister/. There are two potential approaches to implementing the concept.

The first approach would be to develop Bus Meister as part of a research study. The research would have two main objectives: first, providing a useful Web 2.0 application for improving public transport service; and, second, developing a better understanding of how Web 2.0 applications can be used to improve transportation systems and operations. This second objective would be completed by paying close attention to the process of developing the actual application. A formal research proposal will be developed once a suitable funding opportunity is identified.

The second approach would be to test individual components of Bus Meister in more focused projects. These projects might be part of a public transport operator sponsored project. For example, a simple Bus Meister game could be developed as part of the public involvement process for identifying transit priority improvements on a given corridor (analogous to Portland Metro's Build-your-own-high-capacity-system game discussed above).

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