

# Mobile Awareness and Participation in Community-Oriented Activities

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## ABSTRACT

We describe the iterative design of a location-sensitive mobile application for community engagement and its use at two consecutive community-oriented “First Night” (New Year’s Eve) events. Based on initial analysis of personal status posts, blog posts, and semi-structured interviews, we show that providing users with mobile tools relevant to time and locational contexts in their community can scaffold engagement within a community. In the second year of the study we draw from server log data after the event was promoted for public use. Enhancements to the design are discussed to further support civic participation in distributed community contexts, and design lessons are drawn.

## Categories and Subject Descriptors

H.5.3 [Information Systems and Presentation]: Group and Organization Interfaces – *Web-based interaction*.

## General Terms

Design, Human Factors.

## Keywords

Civic engagement, civic participation, mobile blogging, location sensitive applications.

## 1. INTRODUCTION

Past research has observed that semi-public spaces like restaurants and cafés have played an important role in community life by providing opportunities for people to interact with members of the community who exist outside their social networks [6,15]. In recent years, these locations have impacted social life in different ways as many of the cafés and restaurants in local communities adopt free wireless access for their customers. The increased popularity of these networks and the use of these networks to surf

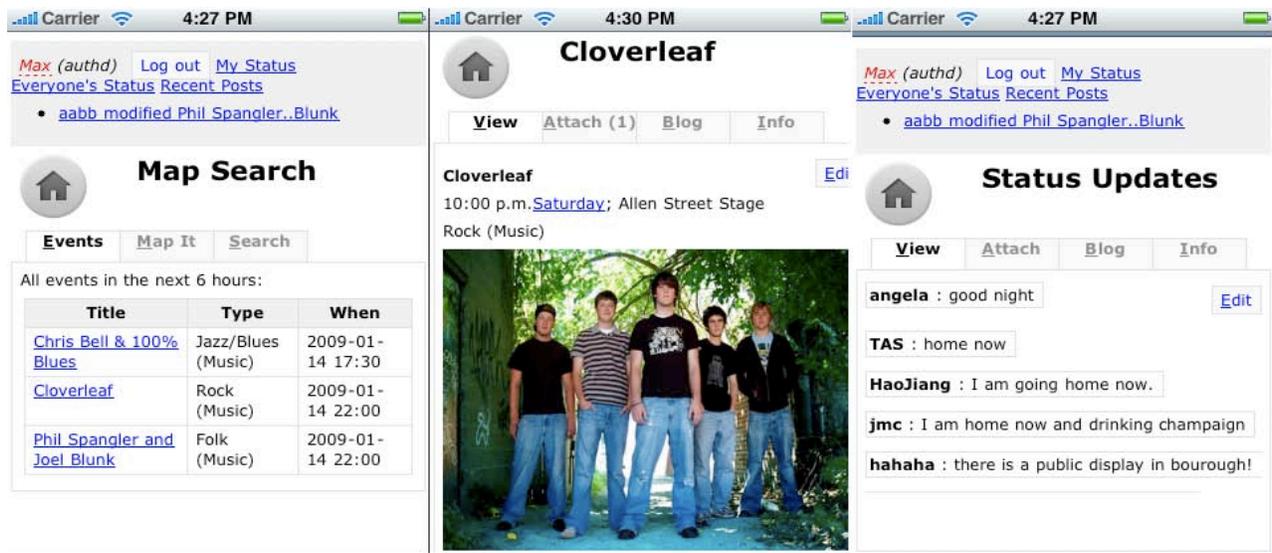
the web in isolation from other members of the community has given rise to new questions about the effects of such networks on individuals and communities. Critics of such technological shifts have questioned specifically whether these activities are diminishing opportunities for social interaction that are important for sustaining democratic and community life [7].

Research in cell phone usage has raised similar questions about the ways in which these technologies affect opportunities for individuals to engage with one another in public space. [18] argue that cell phones create a type of ‘networked individualism.’ He contrasts the cell phone - which is connected to the individual with the earlier land-based phone - which was associated with the home. Where the latter serves entire households, the former generally serves the individual. Others have observed that the ubiquity of the cell phone and its intrusion into public space is changing social norms between individuals. Cell phones interrupt conversations between friends, can be perceived as rude behavior and change social behaviors by making previously private conversations public [8]. Despite the concerns that both WiFi and cell phones are creating increasingly isolated public experiences, other research suggests that both technologies can be used to enhance community life. Research has found that the existence of wireless networks merely changes the context for social interactions in semi-public spaces but does not alter individual dispositions. WiFi, for example, opens up new opportunities for the more socially inclined. [7] showed that individuals who used WiFi cafés to accomplish work related interests rarely interacted with others around them. Yet others used WiFi as segue to talk to strangers when they saw a WiFi user engaging in online activities that also interested them [7].

We agree with Hampton and Gupta who remind us that wireless technologies are not deterministic, “but decisions related to those technologies afford different types of social interactions [7]. Wireless network applications can positively impact socioeconomic growth and development within the communities that use them [13]. Research has shown that E-government and E-participation are direct methods of citizen involvement with civic and governmental activities, and municipal broadband networks are the vehicle necessary to support and improve such activities [1, 14]. Furthermore, new developments in location sensitive software are opening up new areas of research for community informatics research that examines the potential for these applications to facilitate community goals. Location-sensitive applications infer users’ contexts and provide

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**Figure 1:** The community prototype interface showing the home/search page (left) displaying list tab of results, map view is under “Map It”; example wiki page for an event (center); and Status Updates page (right).

information in real-time. These location-sensitive inferences can support community engagement in a variety of ways. For example, such an application could alert a user, via her mobile phone, that a group of volunteers are planting flowers at a park in the neighborhood. We have suggested a combination of these kinds of applications to support civic engagement: place-based blogging, civic smart mobs, and a community history-base [5].

Place-based blogging provides community members with a location-oriented space to comment about events, places, and planned or ongoing activity in their community. For example, community members might blog at the location of proposed construction what the implications of that work will be during the zoning process. Civic smart mobs, based around the idea of a smart mob [17], is one where community members can be rapidly notified of nearby and immediate volunteering needs in their community (e.g. the flower planting example above). A community history-base provides location sensitive history of places in a community, enabling community members to more deeply understand the history of places around them and the events that occurred there. It is our belief that some of this history could be generated from the other two applications above, but it can also be contributed to by members who want to share the history of their community with others.

Yet to date there has been very little data collected about the actual use of these activities in a place-based community context. With this in mind we explore the potential for wireless and mobile technologies to support community engagement by first providing members with information needs during a one day festival-type event and then allowing them to pool collective resources to generate immediate and local reactions to those activities. Specifically, we designed a prototype location-aware application that works with both mobile and laptop devices and uses existing wireless infrastructure in cafés and other local establishments to provide participants with both spatial and interactive features. We explore how such designs leverage existing wireless infrastructure in a community to support local community activities.

In this paper, we discuss a multi-stage study that investigates the design and usability of an application that focuses on mobile access to place-based events and community blogging. We partnered with First Night State College, held in State College, PA on New Year’s Eve to deploy and test our wireless application during the one evening event. The software was first implemented during the First Night 2009 event (December 31, 2008 – January 1, 2009) and then again for First Night 2010. During those times, we publically provided our software system for users to discover activities they could attend and blog about those events at the festival. We also provided a small number of participants attending the festival with devices so that we could more closely observe their use.

## 2. BACKGROUND AND CONTEXT

From community network research, we have theorized that mobile community services can be used to enhance community life. For example, using design principles that promote awareness in a virtual context may enhance social capital by facilitating opportunities for the public to see and be seen, and thus interact virtually, in ways that are different from their fixed community roles [4]. Research of mobile collaborative application designs for community-like locales has mostly emphasized urban gaming, guided tours, and social networking. Urban Tapestries provided community members devices and asked them to annotate maps with similar goals of community engagement [11]. Their field trials had users borrow specific devices with a custom software client. With this in mind we developed our application based on a publicly available web based service and designed with a range of devices with both WiFi and HTML-compliant browsers.

E-graffiti has offered a similar system located on a university campus for place based notes [5]. They reported that most users used the system for chat, and little of the content posted related to the poster’s locational context. Their field trials emphasized setting users loose on an empty place-based environment to see what they would author, while our objective was to scaffold participants within an actual community context (e.g. First Night) and facilitate their engagement in a realistic community context.

CoMedia [9] provides an application oriented toward multi-day events (a rally and a music festival), but with a social networking emphasis on supporting an existing friend-like group (where the group creates stories together about events and plans group timetables together to attend parts of the festival, emphasizing the location of the users rather than the event activities). Our use of festivals to evaluate our system was a means to an end. We wanted to better understand how the community might use our tools over time, and we believe the compressed schedule of the festival provides a method to collect a rich data set for community activity that might be less frequent other times of the year. Also, unlike the aforementioned studies, a web link to our application was publicly advertised for any users who might chose to use it.

First Night State College is an annual event that takes place on New Year's Eve across the downtown area. The event hosts a number of activities including professional ice sculpting, live bands, various entertainers, carriage rides and children's craft workshops. The event begins on the morning of December 31<sup>st</sup> and continues on into the early morning of January first after ringing in the New Year, and brings in a large number of local residents and families.. The event is listed as a family event, and as a result local shops, restaurants and cafés stay open throughout the evening to serve families as they move in from the sponsored events to warm themselves before moving on to another outside activity. WiFi hotspots are available at a number of cafés and in the city's central park, which also hosted a number of outdoor activities.

Because there are numerous activities taking place at the same time, the event organizers publish a book of events and distribute them throughout various locations in the town to allow participants an opportunity to plan their evening. Our project was designed with these considerations in mind.

### 3. MOBILE COMMUNITY PROTOTYPE

To support our objectives, in our first stage, we developed a web-based application that integrates both blogging and wiki-based approaches for community contribution. The intent was for the wiki to contain the more static place-specific content (e.g. descriptions of community events) and then individuals could post related blog comments as reactions to each wiki page.

In our first iteration of the software, we chose JSPWiki (jspwiki.org) as the wiki engine for this work because JSPWiki is built around standard J2EE components -- Servlets and Java Server Pages (JSP) -- and can easily be extended by using plug-ins. Besides collaborative authoring of dynamic hypertext documents, it already has a simple authentication mechanism, blog plugin and file upload functionality. Alongside its built-in wiki/blog support, we added mechanisms to geographically tag wiki pages within the wiki text and new search capabilities to find pages based on event date/time, type, and geographic location. Since JSPWiki is designed for desktop computer web browsers, we used many of the design lessons of collaborative mobile

interaction design [10,12,16] to redesign the wiki interface for mobile handheld use. We removed any unnecessary buttons from the interface, changed the horizontal design so that it would fit many mobile phone web browsers, and increased the size of needed buttons so they could be pressed with a finger. We provided finger pressable tabs near the top of each page to easily navigate between related functionality on a page (e.g. separate tabs for wiki content vs. associated blog comments; separate tabs for list and map views of search results).

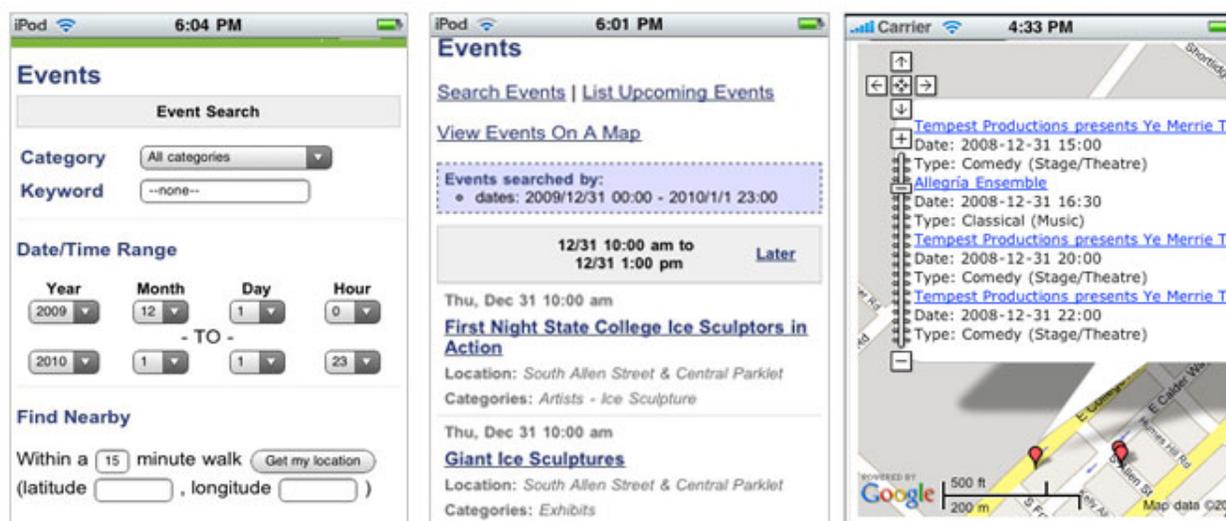
In this version of the software, wiki pages are used for constructing place-based community content. These pages are intended to include a description of a place or event along with a title, location, event date/times and location. This page shows up under the leftmost "View" tab. A "Blog" tab is then provided for each place/event to support community comment contributions related to the event, and an "Attach" tab allows uploading of related media such as photos. The "Info" tab provides a history of edits to the wiki page.

In addition, we developed location aware features for the users. First, the events could be searched through a 3-tab page which was implemented through a set of nested special JSP files and was not user-editable (see Figure 1). This mechanism allowed users to search for and find relevant community content based on event date/time, category (music, art display, etc.), and geospatial data (distance from your current location). These results are then displayed in a mobile device convenient form, with separate tabs to provide links to the found wiki pages in a list form or on a map. The list tab of the search page is the home page for the site, and by default it lists community events that are going to occur within the next six hours, with links to the individual event wiki pages. The map tab of the search page displays pushpins where events are occurring. Tapping on the pushpin for a location displays a list of events at that location in a bubble with links to the individual wiki pages. A third tab is where the user specifies search parameters.

The Search tab allows users to provide query conditions, including the range of the event starting time, the specific event type or all types, and a geographic location range. The location range is effectively a circle where users can specify the central geographic coordinate and a radius distance. If a particular query field is not specified, the query will not consider that condition. The event query results can be displayed as a list or a map.

Since users usually do not know the geospatial coordinates of a place, a "Get my location" button can help them get the geospatial coordinates of the place where they are and automatically fill in the "Center latitude" field and the "Center longitude" field automatically so that they can easily find the events nearby. This locating function was implemented based on the Loki Javascript API and supported by the Loki locating service (<http://loki.com>).

Finally, the tool provided some orienting content such a fixed page with a map of where local wireless hot spots are located, a Recent Posts page where changes to the site can be monitored, and personal home pages where users can post personal info.



**Figure 2: In the second design users could access a search page (left) that included keyword search capabilities and location awareness features. Results returned a detailed list of events (center) that also allowed users to request those events be mapped out.**

We had conducted an earlier trial of this prototype (which is not the focus of this paper) over four days at the 2008 Central Pennsylvania Festival of the Arts, a summer festival with both indoor and outdoor performances and exhibits. We constructed wiki pages with 73 featured events that would occur with their scheduled times, a description and photos (when available). We provided five participants with mobile devices (3 iPod touch devices, and 2 UMPCs), taught them how to use the software and asked them to use the devices during the festival. While the participants were able to use the devices to find activities to attend, we found that there was no noticeable interaction between the participants. In part, this may have been due to how large the festival was and that it was spread out over multiple days. That said, feedback also made it clear that users were not aware of the other participants using the system. As a result, we made two significant modifications to the system to prepare for First Night State College 2009. First, a Status Updates tool was created that allowed individual users to post lightweight messages about their personal status. The Status Updates page itself then contains a list of entries, one for each user, which displays everyone's status. Second, we added awareness information near the top of all pages that included a link in the form "[username] modified [Page Name]" that allowed users to know what the most recent change to the site was, and to easily navigate to that "page" (which included the Status Updates page and blog pages). As part of the awareness information, we also added links along with the existing Recent Posts link to view everyone's status, and to enter your own status.

For First Night 2010, we reimplemented the software from the previous year. One of our goals was to hand-off the software to a community-based organization that would sustain its long-term use, and none of our community partners have web servers configured for Java and JSP. The new implementation was written in PHP and included small enhancements over the previous version, plus the option to submit photos. We also replaced the Loki code to determine the user's location with the W3 Geolocation API (<http://www.w3.org/TR/geolocation-API/>).

In the JSPWiki version of the software, the event list seen by users was limited to the results of a search and those results were all listed on a single page. By default, that search returned events

that would occur in the next six hours, which for First Night returned a very lengthy list to scroll on a handheld device. Also, it left users to do a tedious manual search to find events in the past, even ones that had recently started. This had particularly been an issue when users wanted to post comments about an event they were currently attending or had recently attended. The PHP version of the software shows 10 events per page, and then allows the user to navigate earlier and later in the day. In the new version of the software, the default page shows the next 10 events coming up, and users can navigate earlier and later in the day. Similarly search results display 10 events per page, and the user can navigate to later results. The map view shows the same 10 events per page as the list view, with equivalent controls to navigate to earlier and later views of the map. These changes greatly improved scalability when larger numbers of events were scheduled in the near term.

To simplify adoption we dropped the requirement to have an account to post comments. Despite its use, this change also resulted in our dropping of the feature for people to post personal status updates. The event list itself was updated to show if comments had been posted for an event and if so, how many. The awareness information at the top became an awareness bar with links to the most recent event comment and a link to a page with a list of all the recently posted comments linked to the event.

In addition to the event-based tools, a page was added where users could upload photos to the site. An alternative option to e-mail them to a First Night specific e-mail address was included for users of devices with no web-based file upload capability. The upload page included fields for photo posters to include their name and a short message associated with the photo. A separate photos page cycles through all the submitted photos with their associated caption message.

## 4. FIELD TRIALS

As we mentioned, the prototype was implemented at two First Night events in subsequent years: for First Night 2009 and then again for 2010. We detail below the procedures used during the first and second year of the study.

For the two festival events, we examined usability at two different levels of analysis. In order to test usability at the individual level, for First Night 2009 we recruited participants using the university’s news service, provided them with training on how to use the software, and conducted a series of interviews with each participant shortly after the event took place.

During First Night 2010 we examined basic trends in usage by festival participants. We analyzed web server logs to identify the types of devices used to access our system and the types of activities that users most often accessed. To promote the site among the community we targeted a variety of communications channels for advertising. First, a description of the mobile site and a link was included in the “A.M. Briefing” of the local newspaper (including online edition), and it was also posted to Penn State's official news website before the start of the festival. An advertisement was also placed directly on the Festival’s own main page. In addition, we inserted a flyer into the print version of the First Night schedule of events. The flyer gave a brief description of our prototype and provided a URL for access. These events schedules were placed at various locations throughout the event and distributed to runners who participated in a marathon that was scheduled to take place on the 31<sup>st</sup> as part of the festivities.

#### 4.1 Procedure and Task

In year one, we recruited participants who were already planning to attend the event. Five participants were recruited from among the IST graduate student population. Participants were given either an Apple iPod touch or a Samsung UMPC (ultra-mobile PC), and they were able to connect to the Internet wirelessly. Participants were asked to use the software to search for two activities, update their status in the system, and write two, different blogs. The UMPCs' functionality included a camera to take pictures for blog postings. Two participants used UMPCs and three participants used iPod touch devices. Two of the participants were a married couple (and we assume they attended all events together). The other 3 participants were attending the festival separately, though some of them attended with other friends/family.

At the start of the study (6:00 p.m., Dec. 31), participants gave their informed consent before they were trained on how to use the devices to which they were assigned. They received training on how to find and connect to a wireless hotspot, how to create a user name and access the search, map, and blogging features. The UMPC users completed additional training on how to take pictures and attach them to their blog posts.

One of the objectives of the experiment was to assess people’s general attitudes towards the use of the mobile application. Thus each participant was encouraged to use the search and map features to find at least two events of interest to him or her, encouraged to post their personal status, and asked to author at least two blog posts. We allowed the participants to keep the devices for as long as they desired through the duration of First Night (e.g. overnight).

In year two, we examined server logs and coded user-agent and http requests. We examined user-agent data to first classify the devices being used by our servers as either mobile devices or desktop computers. Second, we classified http requests based on the types of activities that users could choose from the system. These actions included: accessing event data, browsing through

event data, searching events with a keyword, accessing the search page, performing a search, seeing event details, mapping events, posting comments, seeing recent comments, and viewing comments. In addition, we examined the event ids to determine which types of events users seemed to be looking at in more detail. We hoped this data would give us some insight into the types of users accessing our site.

Finally, the second year of the site included a photo sharing feature where participants could upload photos and view photos from other event goers. The photo section also allowed photo contributors to make comments on their own photos. We analyzed both the number of photos submitted and the types of comments made on this section of the system. As part of promoting our system, all advertising referenced a photo contest, with a prize of a \$50 gift certificate which was judged and awarded by First Night staff.

#### 4.2 Data Collection and Result

In 2009, after our participants returned the devices, each person was engaged in a semi-structured interview conducted by one of the investigators. During the semi-structured interviews, we asked each participant about his or her experiences using the device and the software provided. We targeted specific features during our discussion, and encouraged participants to talk about their experiences, as well as what they envision as possibilities for other uses. Interviews are audio-recorded and transcribed before being coded for qualitative analysis. We also used participants' status posts and blog posts for data analysis. Server-side usage data was collected but is not analyzed or discussed here. Additionally, we collected a few critical incident reports from two researchers who were using the software themselves to navigate the festival.

Page Views	# of views	% of views
Home Page	122	41.9
Browse Events	72	24.7
Keyword Search	1	.3
Manual Search	5	1.7
Event Map	12	4.1
Event Search	2	.7
Event Detail	55	18.9
Recent Posts	8	2.7
View Comments	14*	4.8
<b>Total</b>	<b>337</b>	<b>100.0</b>
<i>N= 291, *46 items were removed from the dataset because they were the activities of the researchers. In that set were the 4 comments we used to seed the commenting feature.</i>		

**Table 1: Summary of 2010 Page Views**

In the second trial, our server logs show that approximately 36% of our participants used a desktop or laptop (PC or Mac), approximately 28% of users accessed the system using an iPhone, approximately 28% of users where using iPod Touch devices,

with the remaining 8% of users accessing the system with various Blackberry models. Between 8 a.m. New Year's Eve day and 1 a.m. New Year's Day, the system pages were accessed a total of 337 times with approximately 40% of those hits being to the main events page with the remainder continuing on to either browse event listings (72 times or 24.7%), seeing event details (55 times or 18.9%), to perform a search (10 or 2.7%) or to use the event map feature (12 or 4.1%). The specific events accessed primarily include children's activities and musical or other performances. In order to encourage participants to engage with the commenting feature, we seeded the system with four of our own comments. While we did not find that users actually posted their own comments, our server logs show that our "recent posts" link was accessed 8 times (2.7%) in response to 4 comments which we ourselves seeded during the events, suggesting that participants were interested in reading event comments though they did not post them.

The system also supported the uploading and viewing of photos. Though log data for photo views was not available, there were a total of 27 photos that were posted by users. The themes of these photos included New Year's sentiments, ice sculptures and images of various performances during the event.

## 5. ANALYSIS AND DISCUSSION

In our first year of implementation we quickly learned of a few usability concerns that we had not anticipated. New Year's Eve was a cold night (about 20 F, -7 C) and multiple users commented on their tendency to use the devices indoors more often than outdoors due to the device input being incompatible with gloves. We also encountered a few small but significant usability issues with our current software design. First, since the Status Updates and Recent Posts pages were just wiki pages (with some additional code to format and display updates/changes), these pages also had Blog tabs like the event wiki pages. Some users thought using the Blog feature would update their status, when instead it added comments to the blog on that page. A second related issue was that some users thought the blog content was a global set of blog comments, rather than multiple sets of comments, each specific to an individual event. We removed the Blog tab on the Status Updates and Recent Posts pages in the next version of the software.

Since we designed our mobile software to show as little information as possible, events listed on our default search results disappeared after the event started (the default is to show upcoming events in order). This made it more difficult for people interested in blogging at an event to navigate back to an event that had already started or finished.

We hypothesize in the Design Implications section that this may be best resolved by location-based context support.

### 5.1 Community Navigation & Wireless Access

Unsurprisingly, people used the mobile devices to find the location of events. Both our participant interviews and server logs show this to be the case. Further examination of the events on the server logs showed that people were getting detailed information about music events and children's events taking place over the evening. While we have no way of knowing for sure from server logs alone, we took this as an indication that the system was being accessed by a variety of different types of event goers.

The recruits in our first year study also reported that using the location awareness feature of the system did lead to some problems. Limitations in connectivity led to some recruits not being able to find directions to an event when they were needed. Others reported having some difficulty with the mapping function due to a lack of being clear on the exact location of the building and not always being able to see street signs.

In addition, as with our Arts Festival study, we experienced an incident where the device itself provided an opening for non-participants to interact with our users. A first-time First Night attendee asked a device user what the festival was all about and the software facilitated sharing with that person about what kinds of events were going to occur over the evening.

### 5.2 User Status and Context Awareness

In our previous version of the software, users had to go to a separate Recent Posts web page to be notified of any changes to the site or otherwise recognize differences from a page they had seen before. The version of the software we used for First Night included a single line in the form "[username] modified [Page Name]" near the top of every page, which was then a link to that page. This line refers to the most recently modified page, which for our users was primarily the Status Updates page and pages containing blog comments. All of our participants expressed knowledge of other users using the system, and many of their postings reflected that.



**Figure 3:** In order to foster interactivity, we built a photo sharing component into the site that allowed users to upload photos and include a short message. Lurkers were allowed to view these photos via an online slide show.

Of the 17 status updates posted by the participants, 7 were posts of what building/room the participant was in or what event they were already at (present) and another 4 were about where the participant was going to go (future) as well as 1 more about what one was doing (“eating”). The remaining 5 posts were about the mobile device/software (2 posts), telling others they were having fun/good night (2 posts), and one responding to another’s status post. The longest status update post was 26 characters and the shortest 6. We found it notable that 11 of the 17 posts were about where the participant was or was about to be. Clearly all of the users felt that sharing their location/event context to other people in the system was important.

### 5.3 Event Blogging

In the first year of testing, participants posted 17 blog entries to the system, as well as two additional comments responding to the same blog post. As mentioned earlier, due to our design, users sometimes believed they were posting to a global blog comment set and/or updating their status. That said, all but one of the main blog entries were longer than the posted status update messages. Most blog entries ranged from 1-2 sentences and two posts were full paragraphs. Eleven of the blog entries described an event that the participants were currently attending, had attended, or had tried to attend. Only one photo, of a band playing on the street, was posted to a blog. Two of the participants only posted blog entries at the beginning and end of the evening and another only posted at the end of the evening. This may have been due to the perception that blog posts were to be longer, and the users were less likely to post them while engaged in the events.

Two of the participants did use the blog in the blog-about-an-event oriented fashion we had envisioned. This included posts for three events, in two cases asking if anyone was going to go to that event and in the third case a person said they wanted to go, but another in her party did not. In one case of asking if others were going to the fireworks event, another participant responded that they were going. In response, the original poster then asked the other to take pictures because she had not figured out how to take pictures with the device.

### 5.4 Lurking

For First Night’s organizers, keeping their event up-to-date with the latest technologies is a major motivation for their involvement with our project. To that end, the use of our system as a replacement for the printed schedule of events, for planning time spent at the event or finding out about events on the fly, is consistent with that goal. But considered as a social tool for building community around the event, the low number of comments during the second trial suggests that there is a low level of interest in social interaction. But the number of views of the small number of comments (8 views of our 4 seeded comments) suggests what is commonly referred to in the online community context as lurking. While not entirely a negative as they are an important part of building critical mass in such a system [2], lurkers without leaders or participants leads to little social interaction and no sense of community. Like commenting on events, photos can be seen as contributing to the social use of the system, and so the higher number of photos relative to comments suggest that at least some users had this social motivation beyond just its use as a replacement for the paper schedule, with the caveat of the photo contest mentioned as part of marketing our system.

## 6. DESIGN IMPLICATIONS

Our field trials show that wireless technologies coupled with location sensitive software can enhance community life at place-based events. The strength of our design seems to be that it was useful in helping users find out what events were going on in the community. This was facilitated by having the default web page being a list of upcoming events as this is the most familiar and useful feature for many of the system’s users when contrasted with the printed event schedule and successfully addresses a basic requirement of our Festival partners. Also, our recruits from the first study were comfortable with using the status feature to post where they were or what they were attending. We quickly saw the value in this more textual description of the user’s context. Most location-based social networking applications have focused on who is nearby and/or providing a map of user locations rather than something more descriptive. We believe we can coordinate our event database with the location sensitive features of the device to allow users to more easily post while at an event if they choose to do so (in other words, detect *where* they are and offer the option to post that event info as a status update).

Similarly, in our first trial, some users wanted to blog about events while they were at them. Our design for finding the wiki pages for events defaults to showing upcoming events, which was very effective and simplistic in design, helped users find events to attend. After the event began, however, the system required a complex search to find older events (this was resolved with an option to navigate “Earlier” in the 2010 software). We believe we can also coordinate our event database here with the location sensitive features of the device to determine what event a person is currently attending and provide a location sensitive link to the blog for that event. That will allow direct navigation to the appropriate blog for an event the user is currently at. In a more general application, it is also possible to capture the path a person has traveled and provide a history of blogs for the events they have travelled through. Along with being novel solutions to some of our observed usability issues, this will simplify interaction on the mobile device and further encourage user engagement.

In our second trial, the relative wealth of photos compared to comments suggests that lower cost methods of contributing to the system may increase participation by the public at large. For example, a “like” button for events rather than requiring text input may increase interaction with the system, conferring social awareness at a lower cost. Also, the fact that participants seemed more inclined to upload photos rather than to post comments about events may have implications for future research. It may suggest that users find greater value in community experiences that have an experiential component and a tangible immediate reward. In other words, photos were immediately visible to users after submission and became part of a community slide show collection. In contrast, comments existed in isolation until other users made additional comments. In this sense they may not have facilitated the sense of community we were striving for.

Furthermore, as a future design feature, photos should be meaningfully tied to a location and the specific event rather than just being related to the overall festival. Such information can increasingly be derived from metadata contained within photos by using the location the photo was taken at (from GPS metadata in many mobile phone-based cameras) along with the time the photo was taken. With that photo metadata, pictures can be placed at

individual events to better reflect the history of what happened there.

With regard to amount of interaction with the system and other users, one important difference between the two trials is the fact that the first set of volunteers were all aware of each others' participation whereas in the second, we suspect that most people assumed they knew no one else using the system. Given that one of our goals is to provide opportunities for citizens to use public WiFi as a means of interacting with other members of the community, we feel our current design requires additional consideration. Very few participants actually commented on the events as they took place in the second trial. This suggests that users were either less aware of other people using the software or they were less comfortable posting because they did not know who was using the system. Future design might draw upon the location sensitive features by recognizing where participants are and letting them know if other users are nearby. Such a mechanism may foster greater participation. It is also possible that anonymity works against us at the community level and that including some form of login may allow users to identify each other (or more specifically connect with friends) and respond to each other more readily.

In summary, our experience with the deployment of this system suggests that technology such as WiFi can be applied constructively in a community context to support connections rather than isolate individuals. Though our efforts have not yet reached a critical mass of users in this community, our future efforts will focus increasing visibility of the system to event attendees through the use of large screen public displays and an increased presence in local WiFi hotspots.

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