

Mobile Geotagging: Reexamining Our Interactions with Urban Space

Lee Humphreys
Tony Liao

Department of Communication, Cornell University

Mobile geotagging services offer people new ways to interact with and through urban space. In this paper, we focus on a mobile geotagging service called Socialight and the social practices associated with it. In-depth interviews and participant observation were conducted in order to explore how Socialight's virtual "sticky notes" were used in everyday life. Findings indicated how users communicate about place to help build social familiarity with urban places and communicate through place to allow users to create place-based narratives and engage in identity management. Such findings deepen our understanding of the social production of space and have implications for future location-based mobile services.

Key words: space, place, mobility, media, social production of space, geotagging, tagging, qualitative, mobile social network.

doi:10.1111/j.1083-6101.2011.01548.x

Mobile Geotagging: Reexamining Our Interactions With Urban Space

Mobile technologies allow for people to access information and people in new and exciting ways. Location-based services (LBS) aim to use the location of people, places, and things to enhance interactions (Wang & Canny, 2006). Often drawing on a global positioning system (GPS) to access location information, these services can use such information to provide new and important offerings to deepen users' interactions with the places they inhabit. Mobile social networks leverage mobility of technology to encourage use while people are out and about in their everyday lives (Humphreys, 2007). As mobile social networks integrate LBS into their offerings, these services can couple social and locational information in real time.

Much research exploring GPS-based mobile tagging, blogging, or social networking has been experimental (Eagle & Pentland, 2005; Gentes, Guyot-Mbodji, & Demeure, 2008; Paulos & Goodman, 2004; Salovaara, Jacucci, Oulasvirta, Saari, Kanerva, Kurvinen, & Tiittaand, 2008; Wang & Canny, 2006; Weilenmann, 2001); therefore not exploring how people use such technology in their everyday lives. Thus, the goal of this project is to explore mobile geotagging as a social practice. By "practice" we mean the everyday lived experience of and movement through space (Certeau, 1984). Important research has begun to explore the social practices of LBS, such as understandings of adding longitudinal and latitudinal information to online Flickr photos (Erickson, forthcoming, 2009) and the use of web-enabled scavenger hunts or geocaching (O'Hara, 2008). This study seeks to further this area of

research by exploring what happens when adding “virtual information” to a physical location by leaving virtual sticky notes around a city.

Socialight, a location-based messaging service based in New York, allows users to leave “sticky notes” or messages in particular locations for people in their network. Using GPS, Socialight alerts users if they are near a place which they or someone in their network has tagged by leaving a “sticky.” For example, users could tag the corner deli with a sticky note saying, “remember to buy milk” and when they walk by the deli again, they receive the milk message on their mobile phone. Alternatively, Socialight users have the ability to leave messages for other users.

One of the important aspects of LBS offerings within online social networks, such as Socialight, is the combining of online and offline information. As Erickson points out (forthcoming), the “virtual and the physical-material connect” when geospatial data is added to online content. Growing research explores the complex blurring between online and offline interactions, information, and practices (e.g. Chayko, 2008; Ellison, Steinfield, & Lampe, 2007; Erickson, 2009; Humphreys, 2005, 2010; Markham & Baym, 2009; O’Hara, 2008); no longer is online behavior seen as completely bounded and distinct from offline behavior. This article aims to contribute to this growing body of literature by exploring how people understand and layer information onto the physical world to share with their online social networks through mobile geotagging. While the distinction between online and offline is blurring in many ways, mobile geotagging offers a unique case study to explore these complexities as users of this technology receive “virtual” information as they make their way through the physical world.

In this paper, we focus on mobile geotagging and the social practices associated with it. By exploring how people use Socialight’s virtual “sticky notes,” we demonstrate a) how people integrate mobile geotagging technology into their everyday lives, b) what kinds of location-based communication people create, and c) how people make meaning through this service. We apply social production of space theory (Lefebvre, 1991) to reveal the social, informational, and physical complexities of “place” and media.

Literature Review

The study of Socialight as a mobile geotagging service draws on several broad areas of literature. The service is primarily used in urban spaces, therefore, it is important to understand the characteristics of urban public space into which Socialight is situated. Like other researchers (Dourish, 2006; Harrison & Tatar, 2008; Dourish & Harrison, 1996; Satchell, 2008), we draw on cultural theory to discuss ways in which urban space and place are socially produced through information and communication technologies (ICTs). While Socialight was one of the first services to allow for mobile geotagging, user-generated classifications of information on the net has been occurring for some time. Therefore, we next review literature regarding online tagging and geocaching to draw parallels between other online practices of information organization and social navigation with mobile geotagging services available through Socialight.

Space and Place

Space and place are highly contested terms; hence it is important to try to clearly define how one will use these terms. Cresswell (2004) defines place as “space invested with meaning in the context of power” (p.12). Space is often considered a more abstract term, whereas place is considered more concrete. Harrison & Dourish (1996) suggest that “space is the opportunity; place is the (understood) reality” (p. 69). This distinction can be understood as “place” representing the particular constructed and social reality, while “space” in its abstraction is unlimited. Throughout the paper we draw on these

distinctions and use the term “place” to refer to named or specific locations, whereas space is used to define the broader three-dimensional realm in which we live and interact.

Socialight is often used in urban public and semipublic space, which we define as any space which generally does not restrict who can inhabit the space such as public parks, sidewalks, plazas, etc. (Carr, Francis, Rivlin, & Stone, 1992). Semipublic spaces are those privately owned spaces to which entrance is granted for anyone engaging in the sanctioned activities, and include restaurants, bars, cafes, laundromats, shopping centers, etc. (Zukin, 1982). For the sake of brevity, we use “public space” to refer to both public and semipublic spaces.

Public Space as Social Space

Much like Dourish (2006), we assume both space and place are socially produced. To understand the way mobile geotagging contributes to the social production of public space, we use social production of space theory. Cultural theorist, Henri Lefebvre (1991), suggests three notions of space as it is socially produced: spatial practice, representations of space, and representational space. Spatial practice is how we perceive space as we observe ourselves and others within it. Representations of space are conceived space, which can be understood as how architects and designers conceive and subsequently configure space. As they design and map out space, they assign and embed the space with meaning. Representational space is the lived aspect of space as the symbolic nature of space is experienced. Lefebvre (1991) suggests that space has the illusions of transparency, of natural simplicity, and of giving free reign.

Analyzing the spatial practice, representations of space, and representational space, or the spatial triad in which mobile geotagging occurs forces one to not take for granted the “naturalness” of such spaces but instead to question how this space is socially produced. As Cresswell (2004) points out, Lefebvre’s definition of social space is similar to his definition of place. As people use mobile geotagging services, how they actively produce spatial dimensions and practices should be examined to more fully understand interaction with the technology, with other users and with the space itself.

Tagging

One increasingly popular trend in social computing is tagging, the ability to annotate online material or digital objects. Tags have been described as “freely chosen set of keywords,” (Marlow, Naaman, boyd, & Davis, 2006, p. 31), thus different from hierarchical information classification systems. Tags are usually generated by users of websites, not administrators nor architects of websites. Popular websites allowing users to tag content include Flickr.com (tags online photos), delicious.com (tags urls or links), and Last.fm (tags online music) (Erickson, forthcoming; Golder & Huberman, 2006). Tags tend to be both organizational and social in nature. Zollers (2007) argues that tagging is an inherently social activity because tags are collectively used and produced. Therefore this study draws on Zollers’ description of tags to better understand Socialight as a mobile social tagging service.

Geo-spatial tagging or geotagging is the ability to link a word, phrase, or image to a particular physical location using a standard geographic reference system such as GPS (Heurer & Dupke, 2007). Geotagging links online materials or digital objects to the physical world and ties content to location (Amitay, Har’El, Sivan, & Soffer, 2004; Barkhuus, Brown, Bell, Hall, Sherwood, & Chalmers, 2008; Casey, Lawson, & Rowland, 2008; Erickson, 2009). One example of geotagging is the ability on Flickr.com to link an online photo to the physical location in which it was taken (Ahern, Naaman, Nair, & Yang, 2007; Erickson, 2009).

It is helpful to review both online tagging literatures and geotagging more specifically because Socialight can be understood as both. Socialight could be understood as a form of tagging *offline* objects

or places in that it allows users to add virtual sticky notes with keywords and phrases to particular objects or places in the physical world. Using digital media, Socialight users could add metainformation to offline or physical urban places. Socialight could also be understood as a way of geotagging content because Socialight allows users to link online content accessed either through a mobile device or computer to physical place. In other words, Socialight allows users to add content to place and to add place to content.

Geocaching

Geocaching is another increasingly popular location-based service. While often described as a GPS-based treasure hunt (Neustaedter, Tang, & Tejinder, 2010), geocaching is a form of outdoor recreation that allows people to leave “caches” or small weather-proof containers with log-books in various locations (Chavez, Courtright, & Schneider, 2004). The longitude and latitude of these caches are shared on websites such as geocaching.com so other geocachers can try to find caches using GPS devices. Sometimes puzzles provide additional challenges to finding caches. Much like Socialight’s virtual sticky notes, geocaching involves identifying a physical location, marking it, and sharing that location-based information with others. According to O’Hara (2008), the most common reason for research participants to geocache is to get out and explore the outdoors. Therefore it will be interesting to see if Socialight users also suggest that virtual sticky notes motivate them to explore new places.

Case and Methodology

Socialight is a location-based messaging service, based in New York City, that allows users to leave “sticky notes” or virtual messages in specific places for other Socialight users or themselves. After graduating from NYU’s Interactive Telecommunications Program, Dan Melinger turned one of his class projects into a company and started Socialight. It began as a mobile messaging service for GPS-enabled phones and was one of the first commercially available services of its kind. It was a free service but regular mobile phone service charges applied.

Most users on Socialight kept their sticky notes public rather than limiting who could see them. Using GPS, the Socialight system alerted users if they were near a location where someone in their network had left a “sticky note.” Socialight facilitated communication between people who were colocated, but they were not necessarily co-located *at the same time*. In an interview with Melinger, he described Socialight sticky notes as “communication around place, where a message may be written but only when it’s contextually relevant, as in the person is nearby, does it get delivered to that person.” Temporal distance allowed Socialight members to rely on location as the relevant contextualizing factor in mediated communication.

Socialight was chosen because it was one of the first commercially available services to allow for this kind of location-based message creation and consumption in the U.S. Other geotagging services, such as Flickr, involve taking online content and tagging it with locative information. While the web component of Socialight offered this feature, the primary service of Socialight differed in that it added messages or information to particular places, rather than adding location to online information or objects such as photos.¹

To study the emergent practices of Socialight use, we employed a naturalistic and interpretivist framework (Lofland, Snow, Anderson, & Lofland, 2006). This framework allows us to understand how users of Socialight interpret and understand the service in everyday life. Socialight was founded in 2005 and, like other social media (Gaudin, 2010), had a number of inactive profiles listed on the website. Therefore we could not choose a random sample of registered users but instead had to define a window

of activity from which to try to recruit users of Socialight. We left recruitment messages through the online Socialight messaging system for members who had activity on their Socialight profile within the past year. With Socialight, profile activity is distinct from use, as the mobile service of Socialight can be used without information being posted on a profile for long periods of time. Thus for the purpose of this study we sought out only participants who were actively using Socialight as creators of information by posting sticky notes, creating channels, or commenting on other users sticky notes because they would be best situated to describe their habits and social behaviors surrounding tags they create as well as use. We left about 85 recruitment messages for members who met the criteria of posting information and initially heard back from 16 active users.² Upon following up on these responses, we were able to complete in-depth interviews with 10 active Socialight users.

Where possible we conducted face-to-face interviews in New York City; otherwise we conducted phone interviews with participants. Of the 10 participants, we interviewed eight men and two women, ranging in age from their early 20s to mid 30s. We audio-recorded and transcribed the entire interviews ourselves to ensure the accuracy of participants' statements. All names have been changed to protect the anonymity of the participants. The interview guide included a uniform set of questions asked to all participants about how they integrated mobile geotagging technology into their everyday lives, what kinds of location-based communication they created, and what the messages meant to them. More specifically, we asked about where, when, and how they write "sticky notes," how and why they joined Socialight, why they leave messages, whom they write messages for and whose messages they read, what kinds of places they would and would not leave a note, how they would describe the service to someone unfamiliar with Socialight and what advice they would give a new user about it, how it fits into their other social media use, and how Socialight influences their experience of the places they go. Interviews lasted 30–60 minutes.

Recruitment of users was challenging because the nature of Socialight changed over the course of the study. Socialight began as a direct to consumer mobile social tagging service, but by 2010 had changed its focus to a social media platform for other developers to create location-based services. In particular, Socialight began partnering with businesses to help them create location-based services; therefore, we had difficulty recruiting individual users of the original Socialight service over time. All participants recruited for our study had used Socialight as individual users rather than as developers for their own services, but we were limited from recruiting a larger sample because of the changing nature of the service. Nevertheless, the findings from this study provide important insights into an early and innovative commercial mobile geotagging and location-based service, and exemplify the social production of space in a media-saturated environment.

To gain a deeper understanding, both authors joined Socialight as members. We used the service in New York City and upstate New York. We observed the online component of Socialight as members for more than 2 years to familiarize ourselves with the service and to try to identify changes over time in online usage and branding. Throughout the process, we always self-identified as researchers in our profile statements.

Because this project draws on grounded theory (Glaser & Strauss, 1967), we used an iterative approach to data collection and analysis. This method suggests collecting and analyzing data continuously throughout the research process; therefore, rather than linearly collecting data and subsequently analyzing it, we iteratively collected and analyzed the data to follow up on emergent themes in subsequent interviews. We sought to enhance credibility of the findings by following up on emergent themes in interviews (Lincoln & Guba, 1985). As we analyzed transcripts, we purposefully sought out potentially disconfirming evidence and refined out categories and themes accordingly (Maxwell, 1996). By drawing on both participant observation as well as in-depth interviews, we were able to collect various "slices of data" (Glaser & Strauss, 1967, p. 68) regarding how Socialight was used to increase credibility of findings.

Participant in Context

Describing some of the main characteristics of Socialight users provides helpful details regarding context of use. Much like users of other mobile social networks (Humphreys, 2007), participants in this study are likely to be considered “innovators” (Rogers, 1995). These are among the first adopters of technology. While not recruiting criteria, everyone who participated in this study also happened to work in social and interactive media. For example, participants Nathan and Rick were programmers of mobile phone applications. Because they worked in the industry, they actively sought out new and up-and-coming applications and services as part of personal and professional interest. Another participant, Hannah, was beginning her own start-up company in collaborative online search technology and first heard about Socialight through friends of friends. Sid, Rylie, and Nathan each mentioned that they heard of Socialight on blogs focused on the latest web 2.0 technologies. These early users are important to study because it is at these early stages of adoption when many norms and assumptions of usage are explicitly negotiated and articulated (Marvin, 1988).

Findings

Two themes emerged from the interviews and were further supported by our participant observation. Each theme reflects various aspects of the social production of space (Lefebvre, 1991) as well as similarities to online information organization and social navigation (O’Hara, 2008; Zollers, 2007). The two themes surrounding the use of Socialight are (1) communication about place and (2) communication through place. Communication about place helps to build social familiarity with urban places with Socialight, while communication through place allows users to create place-based narratives and manage their identities with Socialight. Both kinds of Socialight use helped to reinforce social connections as well as deepen users’ engagement with the urban space they inhabited. These two themes do not directly map onto Lefebvre’s spatial triad. Instead, examples within each theme demonstrate the mutual constitution of lived, conceived, and perceived space.

Communication About Place

One common way for Socialight participants to use the service was to tag locations they tend to frequent such as coffee shops, parks, and bars. These sticky notes became a means of communicating characteristics of various locations. For example, one participant, Nathan, used Socialight as a way to communicate with friends about places he likes in New York City. Most of his friends on Socialight are not from New York, so Nathan conceptualized Socialight as a personal travel guide.

If I’ve already tagged some stuff lets say around my apartment or in the area I might hang out in at night then when people come to visit me, then they would be able if they were on the service as well in theory, then they would be able to walk around town when I’m at work and they would be able to see “[Nathan] says this is a good coffee shop” and stop in. (Nathan)

Another participant, Rylie, used Socialight in a similar manner to convey information about locations when she created a channel for friends who were going to a conference in her hometown of Chicago.³

I wasn’t sure if I was going to go [to Chicago for a conference], but I had a number of friends who were going there, who had never been to Chicago before. And I’m from Chicago, originally, so I created a channel to suggest places near the conference site for them to go for. I think I added restaurants, and coffee shops, and some museums, and things to do, some bars. (Rylie)

For Nathan and Rylie, Socialight was a tool through which to communicate with friends about interesting places they might want to visit. Their use of sticky notes was intended to inform a network of friends about particular places. Writing descriptive messages about “good” places not only communicated characteristics about a place but also carried a social element. These participants wrote these virtual sticky notes for their friends.

Messages about place also directly relate to Lefebvre’s (1991) spatial triad. First, messages helped to transform the spatial practice of those who read the messages. Reading about a café that a friend wrote is “good” can influence whether a person actually goes there, that is, change their spatial practices. Second, creating a channel of “favorite places” also helps organize and demarcate a large urban space through a new representation of the space. Thirdly, these kinds of messages also serve as representational space as these “favorite places” held a symbolic meaning to Rylie and Nathan.

Sometimes Socialight users communicated about place for themselves. Two study participants, Hannah and Sid, described their use of sticky notes as a way to document places for themselves. Hannah explained her use of Socialight as a way to remind herself of places she has visited:

I would say [Socialight] is a place to create virtual sticky notes and reminders about things and places that you like and or don’t like if that’s your preference. For instance, I tagged a restaurant where I ate the other night because it was in an area in New York that I don’t go to very often, so I want to be able to remember where it is when I’m back to where it is. (Hannah)

Sid also described Socialight as a service to document places for his own usage:

I would call it a placemaker in a similar way where web browsers have bookmarks. [...] I would give the advice to first start using it to tag the places you like and want to remember. Basically do it for yourself, and then that eventually will evolve into a smaller community or some friends that you can share that data with but my advice would really be to use it for yourself. (Sid)

Hannah and Sid’s comments reveal multiple ways Socialight can be used to connect with place and space. Their creation of maps was in part to share with other people, but also functioned as a way of organizing urban space in their own way. This use of sticky notes as placemarkers engages with Lefebvre’s (1991) concept of representations of space, as the sticky notes serve to flag locations on a map. Both Hannah and Sid also mentioned remembering places, with Hannah specifically saying that the placemark served as a reminder for her to return to a place. This is an example of Lefebvre’s (1991) idea that representations of space or demarcations of space can influence an individuals’ spatial practice in navigating an urban area.

Communicating About Place and Social Navigation. Along with sharing the characteristics of and documenting places for oneself and others, Socialight was used for social navigation. For example, Hannah also described a situation when she used notes for both herself and others for the purposes of facilitating a gathering. She described her use of Socialight sticky notes to plan and organize a bar crawl with her friends:

Here’s the scoop on Socialight and the mojito crawl. I actually used Facebook to coordinate the event, but created a specific [Socialight] channel for the event with stickies for all the spots we were visiting on the crawl before the event. This enabled me to post a map of sorts of our route for those of us who were going to attend the event but wanted to either meet up later or tell some friends

where we'd be. Having already created the stickies made it easy for us to make comments on the stickies during the crawl, so we wouldn't forget what we wanted to say about them. (Hannah, NYC)

This quote from Hannah highlights two important points about Socialight. First, Socialight, like other mobile social networks was not used in isolation but in conjunction with other media (Humphreys, 2007). More than half of users we interviewed mentioned using the Socialight application on Facebook. In fact, Nathan suggested the interoperability of Socialight was one of its main attributes.

The second point Hannah's quote suggests is Socialight could be a means of social navigation through the city as well as a means of engaging more interactively with the city. Hannah created a map of sticky notes for the bar crawl route so her friends could socially navigate their way to the party. In addition, Socialight provided Hannah and her friends a means of commenting on bars and restaurants so as to interact in a new way with places and demonstrates Lefebvre's (1991) spatial practice as people perceived the movement of the group via the channel. It also carved out the city so people would know when and where to Hannah and her friends would be. Lastly, the channel also represents the lived and symbolic experience of the places as people left their comments about their experiences of each bar along the way.

In their different uses of Socialight, a common theme emerged amongst users to mark and remark about various places in the city. Both activities, facilitated through the creation of sticky notes, contribute to the social production of space.

Awareness of Place. Having analyzed how users communicate about place through production of sticky notes, we now turn our attention to how receiving and viewing other people's sticky notes influence users' behavior. When asked if Socialight changed the way he experienced the city, Sid replied:

I guess it did. [. . .] I had just moved into my place in Brooklyn. And I didn't know a ton about that neighborhood I hadn't lived there so I definitely looked to see what was on Socialight to see what people had tagged, that strangers had tagged and marked as great. And there was maybe a dozen of those that you know I checked out over the course of 3 months. So in that sense it totally has. The second way it has and the way I believe location based services have personally changed the way I behave is that it just makes me more adventurous. I want to tag a new place so therefore I will try a new place instead of the same old. (Sid)

When Sid discusses using Socialight tags to familiarize himself with a new neighborhood, he is describing how his use of Socialight changed the way he perceived the space around him. Also interesting about this quote is his qualifying use of the term "strangers" as a measure of personal distance. Sid acknowledges the distant relationship he had with the people whose opinions he was reading, but then suggests that personal distance was not prohibitive in his trust of their opinions and his subsequent decision to explore their suggestions. This represents Lefebvre's (1991) notion of spatial practice as Sid perceives how other people are experiencing places and thus it influences how he himself perceives the place. Similarly, Sid's motivations here are also similar to O'Hara's (2008) findings regarding why people geocache. In both examples, people seek out new places based on evidence other people have been there and enjoyed it.

Sid's description also demonstrates the reprioritization of space that can occur with use of media. In this instance, it shows how a service such as Socialight changed the decision calculus of the user with

regards to their surroundings. Sid describes not only a change in his behavior toward his surroundings, but also an attitudinal shift of being more adventurous. He continued:

I think when I was using Socialight in Brooklyn, it made me a lot more aware of my neighborhood and the greater neighborhood I lived in in general. It raised awareness of what was around me and so in that sense it did change our relationship. I was just much more aware of the neighborhood in general, not even just the places that were on the service, but the places that weren't on the service. (Sid, NYC)

Rylie described a similar feeling of heightened awareness caused by using Socialight:

I think it could make you more aware. Because what I like about Socialight is again how you can post your own photos, so if you're looking at someone's photo that they posted, it makes me want to hear that location - it makes me want to search out where they took those photos. You know, "Oh, that's an interesting view of that building. I wonder where they took that photo from." (Rylie)

Rylie suggested Socialight created a heightened perception in terms of wondering and thinking about shared places, while Sid explains he had an awareness about places on Socialight and even places which were not. The common thread in both comments is having an outlet to communicate about places increases motivation to search out shared places, resulting in a heightened awareness about place in general. To use Lefebvre's terminology, using Socialight impacted their spatial practice as they perceived space differently. This attitudinal shift described by Sid and Rylie provides another example of how having a medium with which to communicate about place influences users' spatial practices in terms of their perception about place and motivation to seek places out.

Socialight members engaged with all three kinds of space that Lefebvre (1991) identifies. As they used and created maps of sticky notes, Socialight members engaged with representations of space. When members used Socialight to navigate their way through cities, they engaged in spatial practice. Finally, when members used Socialight to comment on and give opinions about various places, they engaged with representational space. Each aspect of space is highlighted and constituted through the use of Socialight; however, Socialight use also demonstrates significant overlap in behaviors which constitute each of Lefebvre's spatial triad. One behavior, such as creating a sticky note, can engage in all three aspects of the social production of space.

Communication Through Place

The second theme that emerged regarding the use of Socialight was place-based storytelling and self-presentation through place. For example, a member might leave sticky notes throughout a particular neighborhood to tell a story that occurred at various places in that neighborhood or utilize the place as a means of communicating something about themselves that goes beyond the descriptive characteristics of a place. Communication in this second theme can be understood as occurring *through* place.

Place-based storytelling. One participant in the study, Neville, defined Socialight as a "platform for telling stories." For Neville, Socialight is a creative way of telling stories through a mobile place-based interface. When asked what advice he would give to a new Socialight member, Neville said:

I would tell them to tell stories about their childhood because everyone has stories about their childhood. These stories aren't necessarily big enough to be a biography, but they're tied to place.

Like there's this one story about where a woman got in a car accident. Like no one would be interested in that just to hear it, but if you're at that place then it's interesting. (Neville)

By tying information or stories to location, stories themselves can become more relevant and interesting. Neville was interested in using Socialight in ways to more deeply engage both with stories through place and with place through stories. Understandings of stories are enriched when tied to physical place and experiences of places are enriched when tied to stories (McAdams, 1996). Narratives become both the platform and the mechanism through which to engage with physical place and social space.

The narrative and places also became means through which to connect with other people. Neville recollected a time when he told a story through Socialight notes through Central Park and Columbus Circle in New York:

Central park is a place where lots of people have put stickies, but I wanted my story to be different. So I told a story about a girl. This was last summer and I was kinda into her. I was maybe only the second time I had met her. And we went for a run together and then got a Jamba Juice together and had a great time. Then she never returned my calls. So that was about me telling a secret. Because all stories are secrets. And some you keep private and some you make public. And there's just something about making a secret public. (Neville)

For Neville, telling his story about the girl who did not return his interest provided him with a cathartic experience. Social psychologists have found narratives a helpful way of coming to terms with life experiences (McAdams, 1996, Pennebaker, 1997). Because these narratives are tied to locations, it grounds the stories in the physicality of place. On Socialight, place becomes the means through which stories are both told and read.

Self-presentation through place. Another way communication through place occurred on Socialight is with users' self-presentation (Goffman, 1959) regarding their sticky notes. Participants Mike and Sid described how they attempt to convey a personal expertise and ownership through their discussion of place. Mike discussed how he utilized sticky notes to convey expertise in a genre of restaurants:

We used to eat out a lot and there's a vibrant restaurant scene here in Philadelphia and Philadelphia eaters can be very opinionated and I thought that bumping into something like Socialight would mean oh somebody has to have posted about this new restaurant X. We do eat at a lot of Asian restaurants so I think I could start becoming the premier Socialight user of Asian restaurants. (Mike)

Sid also described a conscious self-presentation in his sticky notes when he decided to post about a particular place:

I used to go to this café all the time. I loved the people and I loved the place and I probably just started tagging that place in every service I could. At a place where I do have a great relationship, I then evangelize essentially across all the location networks I can find. (Sid)

Both Mike and Sid described a sense of ownership with their sticky notes and a desire to be recognized for their tags. Mike used the term "premier" as a marker of status, which demonstrates a personal

goal for his posts. Sid invoked the idea of evangelizing, which can be understood as being the carrier of a particular message. As Dourish notes, “the production of space takes place within specific power relations” (2006, p. 302). This communication about self via a physical location can be seen as exercising power or expertise through a narrative form that situates the user into the conception of place itself.

Through their many uses of Socialight, users revealed how Lefebvre’s (1991) spatial triad can also be applied to communication through place. The narratives can be understood as examples of the intersection of perceived, conceived, and lived space. The sticky note itself has to be associated or connected with a particular location in a city that often relies on maps or a GPS measurement of place, which are considered representations of space. The note as a form of communication through place becomes a means through which the place is revealed as spatial practice. The note as part of the story and self-presentation becomes the symbolic aspect of sociality, communication, and narrative, thus representing Lefebvre’s representational space.

Communication About and Through Place

The themes of communication about place and communication through place are not mutually exclusive. The same sticky note can serve both functions. For example, when Rylie, a Socialight user in San Francisco, created a list of bars for her friends who would be visiting her hometown of Chicago, she was not only describing locations she liked but also communicating her expertise on the establishments. She not only used Socialight to communicate about the places but her expertise and familiarity with the Chicago scene was also communicated through her virtual sticky notes.

Leon, Neville, and Nick also used Socialight to tell stories about new places and have stories also illustrate something about themselves. When they traveled abroad, they left notes in places that they recommended to others. For example, Neville, who was from New York, left the following note at Victoria Peak in Hong Kong:

This is quite possibly one of the best views in the world—and quite romantic (although, sadly, I was there by myself last time). It is the highest point on Hong Kong Island (you are higher than all the skyscrapers for once). Get yourself up to the Peak, preferably at night when the HK lights make the city all that much more beautiful. The view looks down on Hong Kong Island, the harbor and across into Kowloon and the New Territories. (Neville)

Neville also posted a photo he took from Victoria Peak at night to illustrate the view. Based on his experiences, Neville suggested climbing Victoria Peak at night to take advantage of the views and made a joke about it being a romantic scene, even though he saw it alone. Neville shared his subjective perspective on the attraction in Hong Kong to better inform other potential Socialight users.

This kind of tagging is similar to the opinion expression tags that Zollers (2007) found online. Neville expressed his opinion in his note that “this is one of the best views in the world.” At the same time, Neville’s note above could also be interpreted as a performance of self, particularly as he writes himself into the note when he writes “although sadly, I was there by myself last time.” Zollers (2007) suggests that self-presentation tags are means through which people write themselves into the system. In this example, Neville’s sticky note of Victoria Peak communicates his opinion about the place, and his personal regret about not being able to share such a romantic view is communicated through this description of the place as well.

Another example of the mutuality of communication about and through place can be seen in the changing ways that Socialight creators have conceptualized the role of place in their service. Originally,

the Socialight creators had conceptualized place in precise ways using longitude and latitude as a basis for definition and measurement. However, this changed as they explored different ways to use the service:

[Socialight was] always about placed-based messaging, but our understanding of what place meant or could mean changed a bit. In the beginning we were very concerned with tagging actually specific locations with a message and the accuracy of the latitude and longitude that we collect is important. And that's become less important because what we've realized is that we're trying to enable communication around place. It's less about tagging places and more about conversations that have place as a context. (Dan Melinger, Socialight founder)

This quote highlights the two themes that emerged from the findings. First, participants in the study used Socialight to communicate *about* specific places and in doing so built and communicated social familiarity with urban places. Second, communication occurs in the context of place, that is, messaging through place became a means of communicating stories or expertise rather than information just about the places themselves. Much like lived, conceived, and perceived space are mutually constituted, so too we see examples of communication about place and through place being constructed in the same message.

Discussion

Throughout the study we sought to understand a) how people integrate mobile geotagging technology into their everyday lives and, b) what kinds of location-based communication people create, and c) how people make meaning through this service. Our methodological approach reflected our objectives. By recruiting active users and conducting interviews, we aimed to explore users' perspectives on Socialight and their motivations and understandings of how Socialight works for them. The themes of both communicating about and through place demonstrate ways people create location-based communication are not merely descriptive but reflective as well. Not only did communication via virtual sticky notes sometimes describe physical locations in which they were virtually placed, but such communication reflected back upon the authors as well. Location for the participants in our study was made meaningful through the ability to connect with others by sharing information about specific locations and by sharing information about themselves through place-based messages.

Findings from this study help us to better understand who is the audience for mobile geotagging. Like online tagging (Zollers, 1997), messages on Socialight were written for both authors themselves as well as for the broader community. As Zollers (2007) argues, various kinds of tagging are inherently social. When people write narratives and manage their self-presentation through Socialight's sticky notes, they are telling stories to someone even if that audience is not explicitly identified. The audience may be one other person, a small group of friends or the entire Socialight userbase, but the fact the story is told through virtual sticky notes at all suggests and implies sociality in the communication. Regardless of whether people are using Socialight to communicate about place or through place, they are still communicating with others.

This study also suggests people use mobile geotagging to coordinate social movement. For example, this was seen in Hannah's use of Socialight to organize her "mojito crawl" with her friends. Spatial orientation is an important way that people situate themselves in the world (Casasanto, 2009). Therefore it is not surprising to see people use media such as Socialight for coordinating their movements in

urban spaces. Social coordination is not only an important function of other LBSs (Humphreys, 2007), but of mobile communication more broadly (Ling & Yttri, 2002).

Sometimes social navigation was not meant for social coordination but was nevertheless influential. Participants suggested they would go to particular places others recommended through sticky notes. Sometimes these messages may have been reminders for authors themselves but still influenced other Socialight users. Participants also wrote messages with intent of helping others decide where to go. Participants were relatively trustworthy of recommendations on the service. As Socialight moves to a business-service model, it raises the question of how users may interpret and evaluate future messages, particularly if they become more similar to advertising and marketing.

Throughout this analysis, we used Lefebvre's (1991) spatial triad as a lens through which to explore and reveal the complex construction of social space through mobile geotagging. This is important to do because it ties new media to a longer and much deeper discussion of the social production of place, and provides a framework for examining Socialight use. Understanding Socialight as a means through which we live, conceive, and perceive space reveals subtle but important distinctions about the way we socially produce place, which can often seem natural or matter of fact. Demonstrating each and sometimes all of the spatial triad in Socialight use helps attain a deeper understanding of complexities in the changing urban media landscape.

This project has several limitations. The findings from this study are not generalizable to other Socialight users, particularly those who are less active or inactive. We also did not interview anyone who had stopped using the service. The challenge of having to recruit users through the website also suggest it may privilege those users who use the web component of Socialight over those who primarily use the mobile phone to use Socialight. Lastly, studying new media can be challenging because the technology itself is changing. Since we first began studying Socialight, it has changed from a direct consumer service to a platform for other developers to create location-based services. Therefore how people used the service at the point of data collection is probably not how people will use the service in the future. In particular, the context for usage may become more defined in ways that it was not defined at the time of the study. Future research should explore how the changing context of LBS influences users' understandings and practices.

There are several design implications from Socialight and Lefebvre's social production of space. First, LBS should consider that communication occurs both about place as well as through place. Designers should make affordances to easily facilitate both kinds of communication. In addition, LBS design should incorporate aspects of the spatial triad. For example, a design that incorporates spatial practice might catalogue a user's movement through a city and present it back so as to visualize spatial practice. Designers and developers might also allow users to incorporate different kinds of representations of space. For example, this might include allowing users to easily add their own labels or tags to official maps of cities to demarcate space. Lastly, designers may explore ways to include representational space in LBS. One example might allow users to create symbolic tags representing their relationships with others who inhabit a particular space.

While this paper presents only the findings of Socialight use, LBSs are proliferating and it may provide insight into ways people create meaning with these services more broadly. While we did not see much evidence of Socialight being used as a virtual treasure hunt like geocaching, there's no reason why it could not have been. The motivation to explore new places based on information from others was similar to O'Hara's (2008) findings. The idea of *virtual* sticky notes, however, raises the question about the importance of finding a physical cache as opposed to virtual cache. Certainly, the scalability and speed at which virtual caches could be created is much greater than with physical caches. Virtual caches might not provide the same intellectual or physical challenges as traditional geocaches (O'Hara, 2008). On the other hand, virtual caches might provide more flexibility and creativity in the kinds of caches

created because they are not physically confined. Neustaedter et al. (2010) suggest that geocaching has strict norms and customs for cache creation that geocachers feel pressure to conform to. Virtual caches such as the kind that Socialight could facilitate would not need the maintenance of physical caches nor have the size constraints of physical caches and thus may free geocachers to create more creative virtual caches for others to find.

While Socialight's virtual sticky notes may seem like a niche LBS, they can also be considered a kind of user-generated content. Like other forms of interactive or participatory culture (Jenkins, 1992), the sticky notes raise issues about the production and usage of user generated content (Bruns, 2008). In particular, important questions surface regarding the agency of content creators within the broader media system (van Dijck, 2009). Particular concerns may be raised about the potential exploitation (Andrejevic, 2007) and privacy (de Souza e Silva & Frith, 2011) of actively contributing users. Examples such as Socialight broaden our understanding about what constitutes user-generated content and that such content is increasingly moving from the desktop out into the world itself.

Conclusion

One of the goals behind location-based services is to create more contextualized communication. Contextual information here is defined by the colocation of information and people. One of the challenges of this technology is to identify key contexts in which it would be most useful. Leaving a virtual sticky note can be more than just place-based or location-aware communication; it also offers location-enhanced communication. Mobile communication increasingly raises the issue of place as an influential factor in communication. Location-based mobile services try to leverage the richness of physical location as a means of enriching communication patterns and practices. Communication about place and communication through place both emphasize aspects of the social production of space. Future research should continue to explore the complex spaces that advanced communication technologies help to produce.

Acknowledgements

The authors would like to thank the New Media & Society group at Cornell University, the anonymous reviewers, and Dan Galbraith for their helpful comments and suggestions.

Notes

- 1 The authors of the paper have no financial or personal interest in the service and we had no prior relationship or arrangement with Socialight to conduct the project. IRB approval for the project was granted from the authors' institution.
- 2 The users whom we tried to recruit had no personal affiliation with the researchers.
- 3 A channel on Socialight is a way to link sticky notes together by theme. For example, a popular channel during our fieldwork was "celebrity sightings".

References

Ahern, S., Naaman, M., Nair, R., & Yang, J. (2007). World explorer: Visualizing aggregate data from unstructured text in geo-referenced collections. In *Proc. of the 7th ACM/IEEE-CS Joint Conference on Digital Libraries* (pp. 1–10), New York, NY: ACM Press, doi:10.1145/1255175.1255177

- Amitay, E., Har'El, N., Sivan, R., & Soffer, A. (2004). Web-a-where: Geotagging web content. In *Proc. of the 27th annual international ACM SIGIR conference on Research and development in information retrieval* (pp. 273–280), New York, NY: ACM Press, doi: 10.1145/1008992.1009040
- Andrejevic, M. (2007). *iSpy: Surveillance and power in the interactive era*. Lawrence, KS: University Press of Kansas.
- Barkhuus, L., Brown, B., Bell, M., Hall, M., Sherwood, S. & Chalmers, M. (2008). From awareness to repartee: Sharing location within social groups. In *Proc. of the twenty-sixth annual SIGCHI conference on Human factors in computing systems* (pp. 497–505), New York, NY: ACM Press. doi:10.1145/1357054.1357134
- Borer, M. I. (2006). Location of culture: The urban culturalist perspective. *City & Community*, 5(2), 173–197. doi:10.1111/j.1540–6040.2006.00168.x
- Bruns, A. (2008). *Blogs, Wikipedia, Second Life, and beyond: From production to produsage*. New York, NY: Peter Lang Publishing.
- Carr, S., Francis, M., Rivlin, L. G. & Stone, A. M. (1992). *Public spaces*. Cambridge: Cambridge University Press.
- Casey, S., Lawson, S., & Rowland, D. (2008). ItchyFeet: Motivations for urban geospatial tagging. In *Proc. NordiCHI 2008: Building Bridges* (pp. 435–438). New York, NY: ACM Press, doi:10.1145/1463160.1463213.
- Casasanto, D. (2009). Space for Thinking. In V. Evans & P. Chilton (Eds.), *Language, cognition and space: The state of the art and new directions* (pp. 453–478). London: Equinox Publishing.
- Certeau, M. d. (1984). *The practice of everyday life* (S. Rendall, Trans.). Berkeley, CA: University of California Press.
- Chavez, D. J., Courtright, R., & Schneider, I. (2004). Over the river and through the woods. *Parks and Recreation*, 39(4), 68–72.
- Chayko, M. (2008). *Portable communities: The social dynamics of online and mobile connectedness*. Albany, NY: SUNY Press.
- Cresswell, T. (2004). *Place: A short introduction*. Malden, MA: Blackwell.
- de Souza e Silva, A., & Frith, J. (2011). Locational privacy in public spaces: Media discourses on location-aware mobile technologies. *Communication, Culture and Critique*, 4(2), tbd.
- Dourish, P. (2006). Re-Spac-ing place: “Place” and “space” ten years on. In *Proc. of the CSCW '06* (pp. 299–307), New York: ACM Press, doi:10.1145/1180875.1180921
- Eagle, N., & Pentland, A. (2005). Social serendipity: Mobilizing social software. *IEEE Pervasive Computing*, 2(2), 28–34.
- Ellison, N., Steinfield, C., & Lampe, C. (2007). The benefits of Facebook “friends:” Exploring the relationship between college students’ use of online social networks and social capital. *Journal of Computer-Mediated Communication*, 12(4), article 1. Retrieved April 29th, 2010 from <http://jcmc.indiana.edu/vol12/issue4/ellison.html>
- Erickson, I. (forthcoming). Documentary with ephemeral media: Curation practices in online social spaces. *Bulletin of Science, Technology and Society*.
- Erickson, I. (2009). *Locative technologies and the organization of place and space*. Paper presented at the American Sociological Association Annual Conference, August 8–11, 2009, San Francisco, CA.
- Gaudin, S. (2010, March 10). Only 21% of Twitter members are active, report says. *Computerworld*. Retrieved April 29, 2010, from http://www.computerworld.com/s/article/9168798/Only_21_of_Twitter_members_are_active_report_says
- Gentes, A., Guyot-Mbodji, A., & Demeure, I. (2008). Gaming on the move: Urban experience as a new paradigm for mobile pervasive game design. *Multimedia Systems*, 16(1), 43–55. doi:10.1007/s00530-009-0172-2

- Glaser, B. G., & Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research*. New York: Aldine de Gruyter.
- Golder, S., & Huberman, B. (2006). Usage patterns of collaborative tagging systems. *Journal of Information Science*, 32(2), 198–208. doi:10.1177/0165551506062337
- Goffman, E. (1959). *The presentation of self in everyday life*. Garden City, NY: Doubleday Anchor Books.
- Harrison, S., & Dourish, P. (1996). Re-Place-ing space: The roles of place and space in collaborative systems. In *Proc. CSCW'96* (pp. 67–76), New York: ACM Press. doi:10.1145/240080.240193
- Harrison, S., & Tatar, D. (2008). Places: People, events, loci—the relation of semantic frames in the construction of place. *Computer Supported Cooperative Work*, 17(2/3), 97–133. doi: 10.1007/s10606-007-9073-0
- Humphreys, L. (2005). Cellphones in public: Social interactions in a wireless era. *New Media and Society*, 6(8), 813–836. doi:10.1177/1461444805058164
- Humphreys, L. (2007). Mobile social networks and social practice: A case study of Dodgeball. *Journal of Computer-Mediated Communication*, 13(1), article 17. Retrieved April 29th, 2010, from <http://jcmc.indiana.edu/vol13/issue1/humphreys.html>
- Humphreys, L. (2010). *Mobile social networks and urban public space*. New Media & Society, doi: 10.1177/1461444809349578.
- Jenkins, H. (1992). *Textual poachers: Television fans and participatory culture*. New York, NY: Routledge.
- Lefebvre, H. (1991). *The production of space*. Oxford: Blackwell Publishers.
- Lincoln, Y. S., & Guba, E. G. (1985). *Naturalistic inquiry*. Beverly Hills, CA: Sage Publications.
- Ling, R., & Yttri, B. (2002). Hyper-coordination via mobile phones in Norway. In J. Katz & M. Aakhus (Eds.), *Perpetual contact: Mobile communication, private talk, public performance* (pp. 139–169). Cambridge, UK: Cambridge University Press.
- Lofland, J., Snow, D., Anderson, L., & Lofland, L. H. (2006). *Analyzing social settings: A guide to qualitative observation and analysis*. Belmont, CA: Wadsworth Publishing.
- Marvin, C. (1988). *When old technologies were new: Thinking about electric communication in the late nineteenth century*. New York: Oxford University Press.
- Maxwell, J. A. (1996). *Qualitative research design: Interactive approach*. Thousand Oaks, CA: Sage.
- Markham, A. N., & Baym, N. K. (2009). *Internet inquiry: Conversations about method*. Thousand Oaks, CA: Sage Publications.
- Marlow, C., Naaman, M., boyd, d. m. & Davis, M. (2006). Tagging paper, taxonomy, Flickr, academic article, to read. In *Proc. HT06* (pp. 31–40), New York: ACM Press. doi:10.1145/1149941.1149949
- McAdams, D. P. (1996). Personality, modernity, and the storied self: A contemporary framework for studying persons. *Psychological Inquiry*, 7(4), 295–321. doi:10.1207/s15327965pli0704_1
- Neustaedter, C., Tang, A., & Tejinder, J. K. (2010). The role of community and groupware in geocache creation and maintenance. In *Proceedings of the 28th International Conference on Human Factors in Computing Systems* (pp. 1757–1766), New York: ACM Press doi:10.1145/1753326.1753590
- O'Hara, K. (2008). Understanding geocaching practices and motivations. In *Proceedings of the 26th Annual SIGCHI Conference on Human Factors in Computing Systems* (pp. 1177–1186), New York: ACM Press. doi: 10.1145/1357054.1357239
- Paulos, E., & Goodman, E. (2004). The familiar stranger: Anxiety, comfort, and play in public spaces. In *Proc. CHI'04* (pp. 223–230), New York: ACM Press. doi:10.1145/985692.985721
- Pennebaker, J. W. (1997). Writing about emotional experiences as a therapeutic process. *Psychological Science*, 8(3), 162–166. doi:10.1111/j.1467-9280.1997.tb00403
- Rogers, E. (1995). *Diffusion of innovations*. New York: The Free Press.

- Salovaara, A., Jacucci, G., Oulasvirta, A., Saari, T., Kanerva, P., Kurvinen, E., & Tiitta, S. (2006). Collective creation and sense-making of mobile media. In *Proc. SIGCHI Conference on Human Factors*. (pp. 1211–1220), New York: ACM Press. doi:10.1145/1124772.1124954
- Satchell, C. (2008). Cultural theory and real world design: Dystopian and utopian outcomes. In *Proc. SIGCHI Conference on Human Factors in Computing Systems* (pp. 1593–1602), New York: ACM Press. doi:10.1145/1357054.1357303
- van Dijck, J. (2009). Users like you? Theorizing agency in user-generated content. *Media, Culture, and Society*, 31(1), 41–58.
- Wang, J., & Canny, J. (2006). End-user place annotation on mobile devices: A comparative study. In *Proc. CHI'06* (pp. 1493–1498), New York: ACM Press. doi:10.1145/1125451.1125725
- Weilenmann, A. (2001). Negotiating use: Making sense of mobile technology. *Personal and Ubiquitous Computing*, 5(2), 137–145. doi:10.1007/PL00000015
- Zollers, A. (2007, May). *Emerging motivations for tagging: Expression, performance, and activism*. Paper presented at WWW Workshop on Tagging and Metadata for Social Information Organization, Banff, Alberta, Canada.
- Zukin, S. (1982). *Loft living: Culture and capital in urban change*. Baltimore: Johns Hopkins University Press.

About the Authors

Lee Humphreys is an Assistant Professor in the Department of Communication at Cornell University.

Address: Please direct all correspondences to Lee Humphreys, Cornell University, 305 Kennedy Hall, Ithaca, NY, 14853, or via email at lmh13@cornell.edu

Tony Liao is a Ph.D. student in the Department of Communication of Cornell University.