Exploring Engagement in a 'Social Crowd' on Twitter

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Abstract
People use Twitter to communicate with companies and friends, and ask for or share information. Here, we explore participation and engagement in an information-gathering 'social crowd'. We first present a study of engagement behavior through both Twitter Ads and direct outreach, and find that direct outreach achieves a higher engagement rate. Second, by showing people other users' participation with a shared interest, we explore the potential for engagement of social crowds. We demonstrate the benefit to engagement of sharing social context, present a preliminary step towards deeper studies on the social component of engagement, and suggest directions for understanding and supporting social crowd engagement.

Author Keywords
social media; engagement; crowdsourcing

ACM Classification Keywords
H.5.3 [Group and Organization Interfaces]: Asynchronous interaction

Introduction
A common behavior in social systems is using one's social network as an information resource, by asking questions [2, 4, 6]. Prior work focuses primarily on individual users asking questions of their social network. However, work by

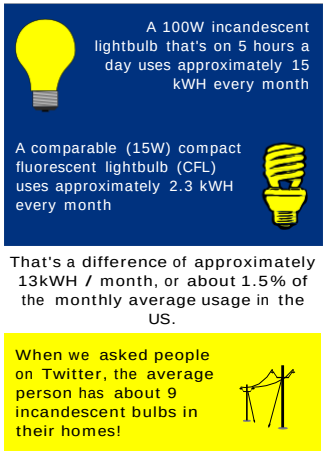

Figure 1: An example of the infographic, which incorporates user contributions (in yellow)

Figure 2: Our Twitter profile

Nichols et al. [5] treats Twitter users as a "crowd", by inverting the direction of the question. Their work asks Twitter users to share information about TSA wait-lines at airports, and aggregates participant responses into a shared resource. Here, we explore the social component of engagement, and ask Twitter users a question around a common interest to facilitate a 'social crowd'. We mirror the structure that Nichols et al. introduce, and extend it in one key way: by seeking to understand the social component of engagement when inverting the request direction. We show users that they are a part of a larger process and show them the social nature of many people participating in parallel. Our study explores how facilitating a social crowd on Twitter can increase participation and engagement around a common topic.

We inform our study through work by Cosley et al. [1] which says that an individual's beliefs about others' effort plays a role in people's participation. Specifically, we ask *"How can social awareness be used to support participation and engagement in 'social crowds'?"*. We approach this question in two ways: a) measuring the *engagement rates* of different outreach techniques on Twitter, and b) *facilitating a crowd information gathering process* by gathering individual responses, incorporating them into an infographic (see Figure 1) and re-sharing the infographic. We chose a topic that applies broadly (household lightbulb energy use) for both steps of our study, and created a Twitter account (*@StudyEnergyUse*, Figure 2) to facilitate our social crowd process. We use this account to ask: "*Hi! I want to understand energy use among Twitter users. How many incandescent lightbulbs are in your home? Thanks!*".

Measuring rates of engagement

Others [3, 5, 7] have shown successful rates of participation by reaching out to users on Twitter, and soliciting responses to requests (answering a question, participating in a survey, etc.), though their methods suggest a successful response rate is dependent on reaching a large audience. To understand what is effective when seeking a large audience, we explore two different outreach techniques: *Twitter Ads*, and *direct outreach* (mirroring Nichols et al. and Mahmud et al., for comparison). To understand general engagement on Twitter, we measure all of the different ways to interact with people (and their tweets) on Twitter. These interaction points (seeing the tweet, replying, retweeting, favoriting, or clicking a link and leaving Twitter) are how Twitters users interact with the system, and one another.

Measuring Twitter Ads

We chose to use Twitter Ads for two reasons: the purpose of Twitter Ads is broad reach, and Twitter's position as the platform allows us to understand when a tweet was seen (or *impressions*[1]) and clicked on. These tools are now generally available, but were limited to the Twitter Ads platform when this study was conducted (Summer 2014). With Twitter's Promoted Tweets tool we targeted keywords related to energy use; we posted 3 different tweets, each asking a question, and containing: **C1)** nothing else (10,966 *impressions*), **C2)** a link to a website where they could respond (12,576 *impressions*), or **C3)** an infographic (7,224 *impressions*). The total engagement rates in each of these conditions were quite low (see Table 1).

It is worth noting that these response rates heavily reflect the quantity of clicks on a given tweet. When clicks are excluded from the engagement rate, condition **C1** received 7 actual responses to the question, whereas condition **C3** received only 3. While these are low numbers, a tweet asking a question (condition 1) elicited more responses,

[1] "Times users are served a Promoted Tweet". Here *impressions* provide a useful proxy for whether or not a tweet has been seen.

	Twitter Ads	Direct Outreach
Tweet(**C1**)	2%	13%
Link(**C2**)	1%	8%
Infographic(**C3**)	4%	N/A

Table 1: Twitter Ad rates via Twitter (engagements divided by total impressions), **Direct Outreach** rates measured manually (engagements divided by total tweets sent).

Scenario 1

Step 1) StudyEnergyUse: *usera1b2 Hi! I want to understand energy use among Twitter users. How many incandescent lightbulbs are in your home? Thanks!*

Step 2) usera1b2: *StudyEnergyUse I have 14 incandescent bulbs in my home*

Step 3) StudyEnergyUse: *usera1b2 based on your answer and answers from other Twitter users, I made this!* [link to infographic as seen in Figure 1]

Step 4) usera1b2: *StudyEnergyUse thanks! Maybe I should try LED bulbs?*

despite having lower overall engagement rate than the tweet that included an infographic. This may suggest that users are less likely to respond when interact with an infographic.

Measuring Direct Outreach

Following a similar structure to our Twitter Ads exploration, we also measured a simple direct outreach technique, replicating the outreach method used by Nichols et al. [5]. Because this portion of the study was external to the Twitter Ads platform, we could not measure *impressions* or clicks on the tweet. Instead, we selected search terms (the Twitter accounts of power companies in major metropolitan areas in the United States, and topics related to climate change and energy use). We then manually sent tweets (using the @-mention functionality) to Twitter users who had used these search terms. We measured two engagement conditions, and again sent a tweet that asked a question, and included: **C1)** nothing else (34 tweets sent out), and **C2)** a link to how to respond (23 tweets sent out). The overall engagement rates using direct-outreach were more effective than those using Twitter Ads (Table 1). We did not believe the third condition (where the tweet contained an inforgraphic) would be an effective strategy, based on the actual response rate (excluding clicks) using Twitter Ads.

	# Tweets	# Engagements
First-tier	654	102
Second-tier	69	36

Table 2: Results from our direct-engagement experiement.

Understanding 'Social Crowd' Participation

Building on our engagement rate measurements, we deployed a study to understand how showing people their shared participation in our social crowd might successfully support engagement. Again, we created an infographic because of two primary attributes: it could be easily understood and contributed to, and a static image allows it to be easily shared through Twitter. One segment (the bottom 1/4th) of the infographic (see Figure) was used to incorporate answers to our question (the mean of responses from participants), and show that other people also participated, exposing a shared context. We incorporated participant responses into the infographic in real time.

We informed our outreach decision from our engagement study, and used a direct outreach method of interaction. We again measured engagement manually, and targeted outreach using the same search terms as before. We then sent tweets to users who had interacted with these search terms. For illustrative purposes, on the left (Scenario 1) we present a fictional interaction, based on successful interactions from our study.

We recorded the overall number of tweets sent out in Step 1, and considered all responses (Step 2) as *first-tier* engagement. After sending out the collaborative infographic (Step 3), we recorded the responses independently from first-tier engagement, because these were prompted by the infographic itself. This *second-tier* engagement (Step 4) is how we measure the impact of our experimental condition.

Tweet 1
@StudyEnergyUse You should show the usage in a glass so people can see the volume of savings.

Tweet 2
@StudyEnergyUse You've seen this, right?(Link to CNN)

Tweet 3
@StudyEnergyUse the average usage in Uruguay in residential costumers is 220kWh, almost the fourth part than in US...

The Effect of User Contributions

We sent 654 tweets in Step 1, and received 102 overall responses (16% engagement rate), 69 of which contained actionable responses. We replied to each of these 69 people with our infographic incorporating that individual's answer into the mean. We received 36 second-tier responses, or 52% of the original 69 first-tier responders. Much of the second-tier engagement involved retweeting our infographic, favoriting our tweet, or following our *@StudyEnergyUse* account. Though in some cases, we received richer types of participation from users, including: suggestions for how to improve the infographic visually (Tweet 1[2]), related news articles (Tweet 2[3]), and providing additional international context (Tweet 3). These richer types of engagement suggest that Twitter affords a number of creative ways to engage with a topic. They also suggest that a collaboratively generated artifact (infographic in this case) may support increased engagement and interest around a topic. However, some of the responses were sarcastic, which may also indicate a frustration with our direct outreach, and raises potential ethical concerns. We did not reply to these responses, and to be minimally invasive, we carefully excluded them from accidental future contact.

Conclusion

Here, we have presented a set of initial findings towards grassroots engagement behavior within Twitter. We measure two ways of understanding engagement rates on Twitter, and perform an exploratory study focused on increasing engagement. We show that by asking questions of Twitter users (treating Twitter as a social crowd), and exposing people's common interest through an infographic that there is a measurable increase in overall engagement. Some of our responses suggest other directions of interacting with people, to further strengthen social crowd engagement.

[2] All tweets have been modified for anonymity to remove the user's account information.

[3] http://money.cnn.com/2013/12/13/news/economy/light-bulb-ban/

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