Tweeting the Drug War: Empowerment, Intimidation, and Regulation in Social Media

Andrés Monroy-Hernández, Emre Kiciman, danah boyd, Scott Counts
Microsoft Research
{andmon, emrek, dmb, counts}@microsoft.com

ABSTRACT

In this paper, we describe how people living in armed-conflict environments use social media as a participatory news platform. We investigate this by analyzing the microblogging practices of people living amid the Mexican Drug War. This paper provides a descriptive analysis of the phenomenon by mixing quantitative observations, content analysis, interviews, and case studies. We characterize the volume, temporal attributes, and information sharing methods. We focus on how citizens use social media to alert and disseminate information about acute violent events, and to interact with other people in their localities. We describe how social media might start to function in lieu of damaged state and news media apparatuses, in particular, through the emergence of communities that congregate around hashtags and the citizens that curate them. Finally, we explore the tensions among citizens, media actors, and the government in light of generalized violence and distrust in institutions and citizens. We end by outlining the implications for system design and governmental intervention.

Author Keywords

social media, social computing, civic media, crisis, crowdsourcing, microblogging, Latin America

ACM Classification Keywords

H.5.3 Groups & Organization Interfaces — collaborative computing, computer-supported cooperative work, K.4.2 Social Issues

General Terms

Human Factors; Design;

INTRODUCTION

Social media have emerged as a communication channel people use to connect with others and get information in extraordinary moments of crisis: from floods [8,33] to earthquakes [34] to terrorist attacks [13] to school shootings [30] to revolutions [1,22]. However, in localities afflicted with armed conflicts, *crises are part of everyday life*, turning otherwise extraordinary events into ordinary ones. Additionally, risk and trust play an even more important role. For example, what otherwise would be simply controversial information, during times of war it can put people's lives at risk. As we will discuss, people living in these circumstances can turn to social media to meet their information needs, especially when the institutions

traditionally charged with providing information are undermined. Previous work has showed how social media and other forms of communication technology in wartime can help citizens maintain routine, enable discussion of topics that were socially unacceptable to discuss face to face, and even change socialization practices, such as finding marriage partners [25].

In this paper, we examine the use of Twitter in the Mexican Drug War, an ongoing armed conflict in a country with more than thirty million Internet users and a highly visible presence of social media in public life. As we will describe in this paper, for many Mexicans social media has turned into a fluid and participatory information platform that augments and replaces traditional new media and governmental institutions. Our goal is to document how citizens are using social media as a resource for both alerts and social support. We focus on three interrelated phenomena: general participation patterns of ordinary citizens, the emergence and role of information curators, and the tension linked to governmental regulation. First, we provide a quantitative description of the temporal properties and dynamics of tweets associated with the violence of four cities over the course of sixteen months. Next, we examine the emergence of citizen-driven curators. Finally, we analyze two approaches to local government intervention: the imprisonment of two microbloggers for allegedly spreading misinformation and the adoption of social media to alert of violent events by another local government.

BACKGROUND AND RELATED WORK

Drug War

The Mexican Drug War is an ongoing conflict of such a large scale that, from 2006 to 2011, it took the lives of more than sixty thousand people (10% of them civilians),and has displaced between 230,000 and 1.6 million people [43,45]. The frequent clashes among drug cartels, the military, and police forces often take place in urban areas, inducing panic and cases of post-traumatic stress disorder [26].

Institutions Weakened by the War

Like other armed conflicts, the Mexican Drug War is also a conflict over the control of information. Local news media organizations and governments have been forced into self-censorship and, some claim, to collaborate directly with criminal groups.

Several local news media organizations throughout the country have publicly vowed not to report on the violence that engulfs the localities they serve. For example, a newspaper in Saltillo (one of the cities discussed in this paper) declared in an editorial [40] that due to the "threats on their editorial staff,"[1] they were "obligated, on occasion, to leave out information." Similarly, a newspaper in Ciudad Juarez, after several of their journalists were killed by drug gangs, directed its front page headline to them, asking: "What do you want from us?" [38]. Also, a newspaper in Veracruz was burned down by criminal gangs [51]. Not surprisingly, a report [46] by the Committee to Protect Journalists ranked Mexico as the third most dangerous country for journalists. The result, according to a Washington Post report [7], is a "near-complete news blackout" imposed by criminal organizations who "via daily telephone calls, e-mails and news releases" decide "what can and cannot be printed or aired".

Local governments, likewise, fail in public communication. For example, the foreign press reported how a mayor of a northern city "mysteriously disappears for days and refuses to discuss drug violence" [7]. Citizens' comments on social media and the comment sections of newspapers are filled with speculations on the reasons for these reasons for this silence: fear of reprisals, collaboration with drug cartels, obliviousness, or an attempt to maintain an image of having everything under control.

Moreover, on those occasions when traditional news media or the government does report the violence, the information is often published several hours later or even the day after the events take place. Hence citizens find these institutions ineffective at alerting them and helping them avoid the violent clashes.

Social Media Penetration

Access to the Internet and use of social media in Mexico has increased significantly recent years. According to a report by the Mexican Internet Association [42], the number of people in the country with access to the Internet increased from 17.2% in 2000 to 34.9% in 2010. The report estimates that most of the 34 million people with Internet access are young: 37% are under 18, and 40% are between 18 and 34.

The report also estimates that social media sites are used by 61% of people with Internet access and that of those, 39% use Facebook, 38% use YouTube, and 20% use Twitter. 53% of Twitter users reported to use it at least once a day, from their home (39%), work (16%), and mobile phone (18%).

These numbers underscore the pervasiveness of social media as an information channel that can reach a sizable percentage of the population.

Los Tuiteros: an Influential Collective

In Mexico, like in many other countries, Facebook has become a common method of communication among friends and families. Twitter, however, has been widely adopted by public figures and become part of the public discourse as a decentralized yet influential collective.

Los Tuiteros, the name used by the media to refer to tweeters, have emerged into having a collective identity. They are portrayed as a homogenous group that is politically engaged, sophisticated, witty, and highly critical of the mistakes made by public figures. Their unified voice is made visible through the Mexican Twitter Trending Topics, which the media often quotes [16].

Los tuiteros have an image of being influential, both online and offline. For example, one of the earliest posts we saw described how the tuiteros helped expose a chain of convenience stores that allegedly increased the price of bottled water during some floods. More recently people have attributed to the tuiteros renaming of a public park with a controversial name [15], the reversal of a legislation that attempted to tax Internet communications [9,16] and even the influencing the presidential campaigns [28].

The self-image of los tuiteros is also one of sophistication and superiority. For example, one of the Twitter trending topic was #TweetsByPeopleComingFromFacebook[3] which invited people to mock the supposedly sophisticated and unsophisticated Facebook users that venture to Twitter [49].

Social Media as Civic Media

As violence spread and traditional news media weakened, frustrated citizens turned to the increasingly pervasive social media for "information and survival" [12]. Twitter in particular came to be one of the principal sources of citizen-driven alerts in several Mexican cities where people often report, confirm, comment on, and disseminate information and alerts about the violence, typically as it happens. Twitter users in Mexico have gathered around location-specific keywords or *hashtags*[5] to create shared information resources. These hashtags have evolved into "insurgent communities" that "emerge from network individuals reacting to perceived oppression, then transforming their shared protest into a community of practice" [10:362–363].

Ethnographic research on the Gulf War showed that Iraqis have reacted in a similar way: "[t]he majority of bloggers who lived in Iraq reported events as they unfolded, as

---

[1] This and other quotes are translated from Spanish by the authors.

[3] In Spanish, the original topic was #TuitsDeLosQueVienenDeFacebook

[5] Hashtags are keywords preceded by the # symbol used to easily search and group tweets.

eyewitnesses" [2]. Blogs also provided a counter narrative to government-controlled media of events in the recent Egyptian revolution [1]. Blogs have been shown to reflect important events in continuing struggles [24]. Use of social media in the Mexican Drug War incorporates aspects of such counter-narrative while also highlighting the practical uses borne out of the necessity of getting alerts of crisis scenarios. People used the comment sections of these blogs and microblogs themselves to collectively grieve, and express frustration toward the government, the criminal organizations, and themselves for the circumstances in which they live.

Organized Crime on Social Media

Almost from the beginning of the war, news media have reported on how members of criminal organizations have used YouTube videos and comments to "taunt and threaten enemies" [31]. Some videos were presumably intended to recruit new young members; others show confessions and gruesome torture of their adversaries [3]. Most gruesome videos are quickly removed for violating YouTube's terms of service, but re-uploaded to other video sharing websites, such as LiveLeak [20]. There has also been much speculation that criminal organizations have infiltrated social media to spread panic in the population. For example, Okeowo [29] reports on how "drug cartels apparently use Twitter and Facebook not only to communicate with one another, but also to spread fear through local communities." Okeowo cites the case of the city of Reynosa (one of the cities studied in this paper), where "people associated with one cartel used tweets to terrorize Reynosa by posting messages that created panic among residents and halted normal activities as the threats circulated online."

PARTICIPATION PATTERNS

Much has been said on the media about Mexican citizens using Twitter to report violent events in their communities[11,12,29,52,53]. However, little is known about the volume, content, and the people involved. Through an examination of tweets on the Drug War, we show how people use hashtags to alert each other and document important events in their localities.

Method

We identified four hashtags used in connection with the reports of violence in four different cities (see Table 1). Using the Twitter firehose, available to use through our company's contract with Twitter, we collected the entirety of tweets containing those and other keywords over the course of 16 months, from August 2010 to November 2011.

We selected these cities in particular because they have been hit by the violence during the time we of our observations and because of our close familiarity with them. Also, three of them are very similar to each other in population size and the four is the third largest city in the country and one of the largest cities in North America. We

identified the set of relevant set of hashtags and keywords by:

a) Searching and browsing Twitter. Since early 2010, we have been informally monitoring Twitter for references of the violence occurring in the country.
b) Snowballing. Once we identified a term, we started to search for other terms included in the same message. This led us to find additional terms.
c) Monitoring local Twitter trending topics. For the past few months we have followed the country's Trending Topics, which often are related to the violence.
d) Reading news reports. Once Twitter became known as a website where people were alerting each other, the news media started to report about this phenomenon and even use Twitter as the source for their articles related to the violence.
e) Follow influential users. Occasionally journalists and news media organizations would amplify information from social media, this helped identify additional keywords.

Through this process we identified several keyword, including different Spanish words for "shooting" (such as "balacera" and "balazos"), the names of the four cities, the user names of people we identified as particularly active, and the hashtags used specifically for each city and for prominent violent events. These led to a collection of close to four million tweets (3,851,575) posted by more than a million users (1,029,448). However, to simplify our analysis and to have a balance of keywords per city, we focused only on the oldest and most active hashtag for each city listed in Table 1, which resulted in a corpus of 609,744 tweets for the four hashtags listed on Table 1.

City	Population	Hashtag	Tweets
Monterrey	4,080,329	#mtyfollow	211,278
Reynosa	607,532	#reynosafolllow	155,786
Saltillo	823,098	#saltillo	153,879
Veracruz	702,394	#verfollow	87,801

Table 1. Selected cities, their population, and hashtag.

Later on, as a way to have data from a city not at war, we collected one month worth of data of Seattle, WA, a city similar in population size (3,344,813) to Monterrey. This resulted in 1,495,786 tweets.

Results

Interaction and dissemination. We found that, except for one of the cities, a third or more of the tweets (29.9 to 40%) were *retweets,* while a fifth were *mentions*, that is, tweets that included the name of another user (see Table 2). This is the opposite from Seattle where there were more tweets with mentions (50.7%) mentioned than retweets (15.7%).

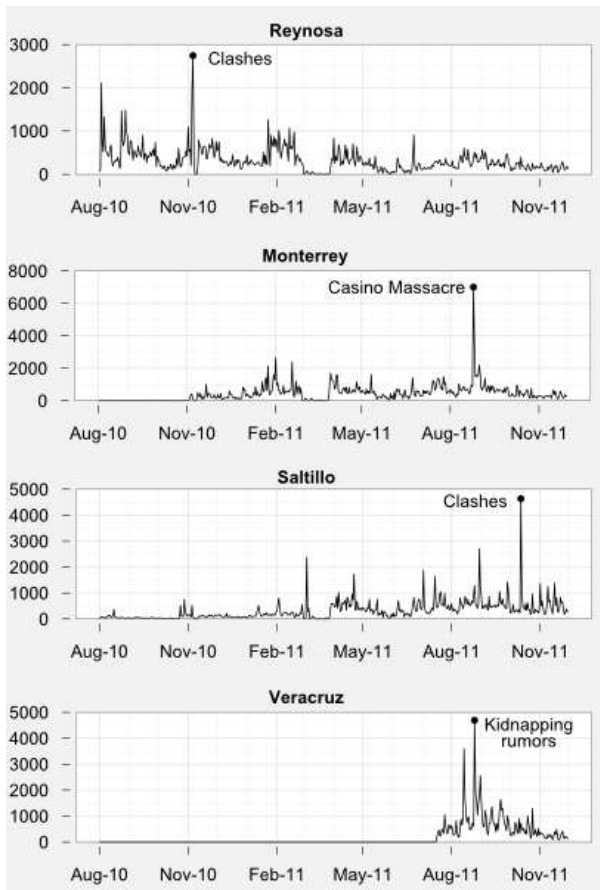| City	Median Daily Tweets[6]	Mentions	Retweets	Users
Monterrey	340	20.5%	40.1%	27,170
Reynosa	249	24.8%	15.9%	9,043
Saltillo	219	19.9%	29.9%	16,347
Veracruz	494	22.5%	35.3%	12,522

Table 2. Aggregate results per city

Figure 1: Tweets per day for each of the cities' hashtags

Volume. The number of daily tweets per day goes up and down constantly, spiking when violence erupts then decreasing when the city is calm (see). The biggest spike in Monterrey (7,027 tweets) occurred on August 25, 2011, the day of an attack of a casino where 52 people were killed [4].The news broke on Twitter where people started sharing images of the event. For Veracruz, the biggest spike (4,699 tweets) happened in an event, also on August 25, 2011 but seemingly

unrelated, when rumors of school children being kidnapped spread on social media (an in-depth analysis of this event in a section below). The biggest spike in Reynosa (2,745 tweets) happened on November 6, 2010 after intense clashes erupted due to the capture of a prominent drug lord [23]. For Saltillo, the biggest spike (4,637 tweets) occurred on October 12, 2011 also linked to clashes caused by the capture of a drug cartel leader [37].

Staggered adoption. also suggests that the adoption of Twitter did not happen at the same time across the four cities. For example, Veracruz adopted this medium much later. A likely explanation is that the practice spread as the violence spread. For example, we identified the first instance of the #verfollow where one person tells another of the possibility of using the hashtag #verfollow to find information about Veracruz: "you can find information about the state in verfollow or alertavera, messages should be short." Shortly after, another person sent tweet to an influential Twitter user informing him or her of the new hashtag: "there is a new follow for Veracruz: #verfollow." It is interesting to note the user of the follow as a noun.

Content. In terms of the content, as expected, the most common tweets are about reporting the location of shootings. We did this by performing a word count of the tweets from Monterrey. We found that the most common words are those used to refer to *places* in the city (such as the name of streets and neighborhoods), followed by words associated with *shootings*, followed by the verb "to report", followed by generic references of people references. Interestingly, the hashtag for a different city (Reynosa) is also one of the most common words in the Monterrey.

Type of Words	Words (Spanish)
places	zona, san, sur, altura, garza, col., av.
shootings	#balacera, balacera, balazos, detonaciones
report	reportan
people	gente, alguien
city names	#reynosafollow

Table 3: Most common words in Monterrey

Individual activity. We found 65,082 unique posters across the four cities, who, on average, posted 9.4 tweets each. More specifically, those who posted new reports did so at a rate of 10.8 per person, those who spread tweets did so at a rate of 4.1 retweets per person, and those who referenced others did so at a rate of 5.5 per person. A few users contributed most of the content. For example, in the hashtag associated with Monterrey, half the people (52.8% or 14,898) tweeted only once, while a

---

[6] For Veracruz it covers only from Aug 2011 to Nov 2011. Includes period of time in April when data collection did not capture the entirety of the tweets, hence medians are likely larger.

tiny fraction (0.03% or 9 people) tweeted more than a thousand times each

Discussion

First, we found that in the context of three cities, Twitter is used more for disseminating information (i.e. retweets) than for interactions (i.e. mentions). This would also explain the common use of Twitter for other purposes including the search for blood donations and even commercial purposes, which is often frowned upon by the community, as exemplified in this tweet:, "Sirs, I have created #mtyfollou so you can write your f*** stupidities there and stop misusing #mtyfollow." As for the city with a bigger proportion of mentions, we find that for many people, Twitter is not only about alerts but also about interacting with others and creating of bonds among those participating in the hashtags. This supports the idea that hashtags have come to represent a commons-based peer-production community [5]. The community aspect is exemplified by one of the most common tweets on the Reynosa hashtag being the greeting "good morning" to the members of a hashtag.

Putting these data in the demographic context of the cities we examined, it is important to note that, on average, 1.48% of people living in the cities analyzed posted something on Twitter about the drug war. Assuming these cities have similar Internet penetration as the rest of Mexico (34.9% of the population, as cited above), an average of 4.2% of the online population has posted something about the drug wars on Twitter. These estimates have many limitations because they assume: 1) people tweeting with those hashtags live in the city associated with the hashtag, 2) Internet penetration is homogeneous, and 3) people have only one account. Conversely, not every person uses the hashtags we analyzed. Additionally, Twitter's estimate that 40% of their active users sign in to "listen" [35], might also suggest that the percentage of the population reading tweets about the drug wars is far higher than those posting them.

THE EMERGENCE OF CIVIC MEDIA CURATORS

Analyzing each user's follower and tweet counts, we find (on the top left corner of the graphics of) that a small number of highly-followed users have contributed a handful of tweets with the hashtags associated with these cities. For example, *CNN en Español*, which has more than a million followers, tweeted once with the Monterrey hashtag. There are other cases of media personalities using these hashtags which explain the rest of the outliers located on the top left corner of the Additionally, an also small number of users have a lot of followers and have contributed a lot of tweets (located towards the top right corner of the graphics in) are what we call *curators*: both highly influential and active participants on the community that revolves around the city's hashtag. Previous research has examined ways of classifying Twitter users by activity [27], however, to our knowledge curatorial roles on microblogging have not been

extensive explored. We will expand on these curation phenomenon in the next section.
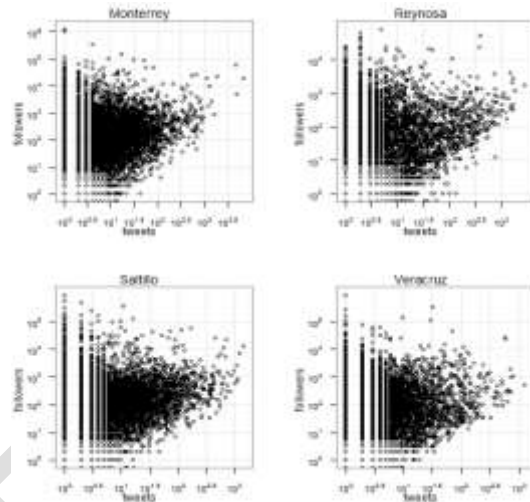

Figure 2: Followers and tweets for all users

When we categorized the top ten most mentioned users in each city, we find that they are a mix of politicians, news media, and the citizen curators we introduced in the previous section. We call them curators because their role is both to aggregate and disseminate information to a large number of people in the city who follow them and often send reports to them. These curators often strive to protect their real identity. Our observations suggest that some of them represent citizen efforts intended to address the need for curation and aggregation of the rush of real-time tweets of acute events.

City	Politicians, Institutions	News Media	Citizen Curators
Monterrey	1	1	8
Reynosa	1	0	9
Saltillo	3	5	2
Veracruz	1	0	9

Table 4: Ten most mentioned user accounts in each city

Results

We put together a list of the most active users[7] in Monterrey by selecting those individually responsible for 1% or more of the city's tweets. This resulted in a list of ten users: one was responsible for posting 3% of all tweets, two were responsible for 2%, and the remaining seven were each responsible for 1% of the posts.

Some of those who posted frequently had few followers, while others had many followers (median: 9,305).

---

[7]We avoid mention the usernames of the people studied. We make exceptions for highly public accounts.

Likewise, some accounts were regularly mentioned by others while others received few mentions (median: 303). The four accounts with more followers and mentions than the median all engaged *information curation*, that is, receiving, responding to, and retweeting dozens of tweets from other accounts. Examining the dynamics of these accounts sheds light on the kinds of practices that are emerging in this ecosystem.

Three of the accounts were created in 2009, the year when the violence in the city started to take off. These three all identify themselves as women who want to do something to address the violent situation of their city. For example, one of the accounts describes herself as "Praying for god to bless Monterrey," while another claims to be the "founder" of the concept of "city surveillance" and part of a "citizen network to protect and provide tips about civic safety, to avoid becoming victims of crime."

When interviewed about their motivations, two of these curators cited altruistic reasons. One of them said "I always make clear is that tweeting is an altruistic community service," and added "it's like if I was a news correspondent on social networks of the war we are living." The other said that people tell her she is "like their angel for looking after them" to which she added: "that is one of the strongest motivations for me to continue tweeting daily!" Both of them mentioned being on top of their Twitter account throughout the day, one reported spending about 15 hours a day while the other just said "many hours."

It was clear that both of them spent despite the fact that tweeting was a

The fourth account, *CIC* (which stands for Center for Civic Integration), emerged in 2011 and describes itself as a "network of trust, 100% driven by citizens that provides clear, reliable and authentic spaces for participation and to strengthen citizenship and quality of life." Unlike the other more organic, pseudonymous, and sometimes controversial hubs, this account presents itself as a civic organization with a public presence in the media, staff, and offices. The organization also receives reports through e-mail, Facebook, and phone, and it has staff that continuously checks these various communication channels and updates an online map mash-up. Although the organization was born out of citizen's frustration for the violence, it has expanded its reach to cover all sorts of urban issues such as problems with street signs and even psychological counseling for those suffering from the effects of the violence. Unlike the other three curators, this account maintains a more formal, serious businesslike presence online, while the other curators take a personable approach that implies their posts come from passionate people.

Together, these four curators have 115,678 followers, almost three times the followers of the governor *RodrigoMedina* (40,822) and almost as many as the most popular news media organization *Telediario* (139,919).

It is important to note that, besides these information curators, the other actors with a significant number of followers in the city are government officials (for example, the governor, the city policy, and so on), news media (for example, newspapers and TV), and journalists.

Most leading journalists in the country are on Twitter, and some are quite active. Similarly, most news agencies and newspapers maintain Twitter and Facebook accounts where they post, presumably automatically, links to their latest articles. Just as the citizen curators, people often send messages to journalists to let them know of specific acute events as they occur in the hopes of getting them to cover the event on mainstream media, and at times, they also criticize them for allegedly hiding information or making mistakes. Several journalists have raised skepticism about the potential for social media to spread fear and misinformation [18].

Challenges

Curators are not without controversy. We have interviewed several of them and gotten to learn more about their motivations and concerns. One concerned shared by most of the ones we talked to was the issue of theft of tweets. The second one was the lack of trust and cooperation among curators in the same city. When asked why, one of the curators said: "I can't recommend anyone" and that "after what happened with AnonCurator[8], I can't vouch for anybody, because I don't know who is behind that account. They are anonymous." This curator is one of the few that shows her face and has mentioned her real name publicly, the others go at lengths to maintain a high degree of anonymity. The scandal referred to by the curator was one reported on Blog del Narco [41] claiming that "military intelligence" had found evidence that suggested that AnonCurator one of the leading curators in the city had been tricking citizens into "hawking" or reporting the location of the military convoys. Despite these and other suspicions, news agencies have been unable to validate whether cartels are using social media for that purpose [36].

Furthermore, even organizations like CIC are not immune to criticism, one of the curators interviewed mentioned that CIC is "an association that presumes not having political objectives, but obviously, there are entrepreneurial-political interests. […] not because they are in politics they are doing something wrong, not at all, that's great! But saying that it's from citizens for citizens, without political goals, I mean, don't say something you don't really are."

The curators interviewed also objected to the reuse of tweets without credit, one of them said: "I do not like that people often do not give credit in the retweets of my tweets," and when asked how this could be solved this person said "it would be the about the ability to be treated

---

[8] Fictitious name

with importance, be given credibility, which would let more Twitter users know about you."

Discussion

Nationally, there have been several efforts focused on curating information. One of the most popular ones is the blog called "Blog del Narco", which has been the subject of much controversy for publishing gruesome images and videos from the drug war that traditional media does not publish [21]. The blog went through several challenges, claiming to be attacked by hackers and targeted for censorship by the government through Google's Blogger platform [14,19] until it eventually merged with *Notirex*, a lesser-known news website [6].

Although traditional journalists regularly serve as curators, both on Twitter and in the more mainstream media outlets, the rise of citizen curators suggests that existing outlets are not meeting public need. Both government officials and journalists have idiosyncratically engaged on Twitter, but much of why the citizen curators have been successful in building an audience stems from their willingness to curate information even when government agencies, journalists and other media outlets are not.

The rise of social media as an alternate information channel has enabled the emergence of civic media curators, some of which have turned into more institutionalized civic organizations. This nascent form of civic engagement is new in Mexico and has the potential of becoming an important force to grapple with as the traditional institutions weaken. Yet, this practice is not without controversy. Several journalists have raised skepticism about the potential for social media to spread fear and misinformation [18]. In addition, indeed, the fear of inaccurate information spreading has prompted government agencies to clamp down on citizen curators.

GOVERNMENT INTERVENTION

Given governmental anxiety around citizen curators, we decided to examine what happens when information flow is regulated through government. We present the events of Veracruz as a case study to examine the government reaction. The case highlighted the challenges with trust and government regulation.

Regulation

The largest spike we find in the Veracruz data (see) represents the spread of a rumor on Twitter that led to the imprisonment of two Twitter users. On August 25, 2011 at 11:56 AM, a Twitter user reported that five kids had been kidnapped at a school: "#verfollow I confirm that in the school 'Jorge Arroyo' in the Carranza neighborhood 5 kids were kidnapped by an armed group, there's panic in the zone." The message was retweeted by twelve people, including one of the curators of #verfollow, an account with more than 5,000 followers.

Immediately, the rumor started to spread like wildfire. People spread the news through Facebook, e-mails, and text messages. A few minutes later, the same user reported that the cell-phone network had gone down. Additionally, several other Twitter users reported other incidents in schools and helicopters supposedly flying at low altitude. By noon, only four minutes after the first tweet, the governor of the state of Veracruz tweeted from his personal account that the rumor was false and asked people to disregard the reports. However, by then it was either too late, or the governor was not considered a reliable news source. Dozens of parents rushed to pick up their children from school, causing massive traffic, chaos, and panic across the city.

Three hours later, the governor tweeted that his government would go after those who spread the rumor: "We have identified the source of today's misinformation; […] this will have legal consequences according to Article 311 (terrorism)." The same day, a state government website listed sixteen Twitter accounts involved in the rumor and threatened to take legal action against them. The statement also mentioned the full name of the people associated with one of the accounts. By Saturday, two people had been arrested on charges of terrorism.

Many tuiteros countrywide rallied in opposition to the arrests, jokingly calling themselves "Twitteroristas." After much pressure, the state government released the Twitter users but enacted a new law that penalizes the use of social network sites for spreading misinformation that might cause panic.
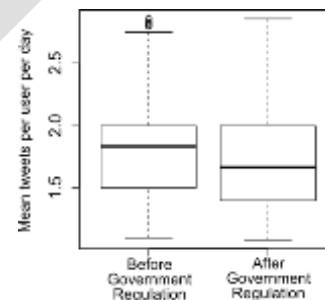

Figure 3: Comparing average tweets per user per day before and after Aug 25, 2011

We found some evidence to suggest that the events of August 25 had a "chilling effect" on the level of participation in Veracruz. First, we looked at the people who tweeted with the Veracruz hashtag before August 25, 2011. We then calculated their mean[9] number of tweets per day before Aug 25 and compared it to their own mean after Aug 25. We found that the mean dropped from 1.70 tweets per day to 1.23 ($t = 14.3141$, $df = 1376.226$, $p < 0.001$). More work is needed to see if perhaps this reduction could have been caused by a decrease in the violence itself or perhaps the use of a different hashtag.

---

[9] Calculated based on the days when the person tweeted.

Adoption

Although several local governments have been reluctant to publicly accept the severity of the violence in their regions [32], others have turned to social media to deal with what they perceive as false rumors spread online. Some local governments have created Twitter accounts to connect with their citizens and report "risk situations", as the violent events are euphemistically called. Examples of this are the Attorney's Office of Coahuila, the state of which Saltillo is the capital, [47], and the city government of Reynosa [48]. The former came to replace the personal account of the State General Attorney, who often would report on the attacks. These governmental accounts are not without controversy; often citizens claim that these accounts stay quiet in midst of major events, while others have questioned the reliability of the information posted there [17,39,44].

A recent interview with the spokesperson of the Attorney's Office of Coahuila [50], who is now in charge of the official Twitter account, describes the process of verification before he or his staff tweet an alert within 5 minutes of receiving report:

> "[I]n that span of 5 minutes, a set of calls begin, both to the police, and to the various corresponding departments within the municipalities. Once we confirm and check up all this information with the original sources, or when we check the provenance of the things that appear first on social networks, then we upload […] a tweet […] through Coahuila's general attorney's office account. I operate this account in coordination with general attorney's staff. We post a tweet telling people about what is happening at that moment."

The spokesman also encourages people to be more careful about their tweeting and even started a campaign on social media for "responsible tweeting", he explains: "It's very easy for some people [to] post things to social networks right away […] without firsthand knowledge, sometimes because they heard something from a cousin, or a nephew, or someone else. We cannot do that."

IMPLICATIONS

We have shown that social media creates an alternate "user-generated" channel of communication that can address weaknesses in information flow. However, this new channel comes with its own challenges such as issues of trust, reputation, and misinformation. While more research is needed, based on our early observations of this armed conflict, we offer the following suggestion for system designers and government officials. We hope future research can challenge or extend some of these ideas.

Implications for system design

While sociotechnical solutions are promising, like the ones CIC has introduced, there is room for improvement on these technologies.

Building on some of the descriptions provided by the curators it seems that social media's main limitations are: the tension between trust, reputation and anonymity; the need for recognition (despite it being an altruistic activity), and the difficulties that come with the need available time to perform the curatorial tasks. With that in mind, we think that future implementations of sociotechnical systems designed to support civic media in war-like environments should aim for a balanced combination of automation (to help with scale and time) and relationship-building interfaces. We do not know what those would look like, but we propose a few ideas.

Aggregation and Ranking. A system that can save time for curators and other people could try to automatically detect tweets that refer to the same event, and rank the event among the other events in the feed. This aggregation and ranking heuristics should be transparent to people and perhaps even customizable, and they could use some of these variables for ranking:

1. Volume: the total number of tweets over certain time frame.
2. Network diversity: importance given to tweets coming from different separate or disconnected networks formed based on "follower" relationships (e.g. something becomes more important if people from different parts of the network talk about it).
3. Burstiness: the system should be able to detect the sudden spike of reports related to the same event.
4. Reputation: give more importance to users who have submitted accurate reports before, account for the longevity of the account, number of followers and tweets.

Currently Twitter's trending topics do a decent job at the detecting bursts, but it does not take into account any of the other variables.

Reputation and Community. A lot of the existing technologies focus on information but not so much on building relationships between people. We would suggest the creation of tools that foster the creation of bonds through long-term interactions that not only allow the exchange of messages, which Twitter already does, but that it also allows for a diverse range of ways of displaying reputation. Currently Twitter has only one: follower count, but people might want to play different roles and still be given credit for their work.

Implications for governance

Government regulation has the potential of cooling free speech: fear of punishment can undermine people's willingness to contribute to a common good, while complete abandonment can breed misinformation as it is the case of Veracruz.

Additionally, there is a common refrain among proponents of social media in Mexico that argue that the government needs to use social media if it wants more control of

information flow. However, as the cases presented here show, it is not only a matter of being present but about engaging in fruitful interactions overtime that can help the government, just as anyone else, to gain reputation and creditability among social media users.

Based on our preliminary analysis we put forward the following recommendations that can be thought of as hypotheses for future research.

1. Broadcast prompt and relevant messages. Publish timely and relevant information related to public safety. Do not wait hours or days to release information that can help people avoid risky situations. Do not use social media only as another platform to publicize the administration's accomplishments.

2. Engage with citizens. Establish public channels of communication with curators and the public at large. Build relationships over time. Join public conversations, but expect criticism and push back. Social media is expected to be participatory, but governments often forget to interact with their audience.

3. Avoid regulation. Regulation is ineffective at reducing misinformation and has the side effect of dampening civic engagement. While well-meaning, government interventions often have unintended negative consequences.

CONCLUSIONS

As social media becomes permeates through most of society, its role in armed conflict are only posed to rise in prominence. From the Arab Spring to Occupy Wall Street, social media is one of the information platforms used in a wide range of moments. In this paper, we describe how these technologies are currently used in war-like environments, and what their promises and challenges might be in the future. We illustrate the volume of activity and the number of people using social media to alert and connect with others during recurrent acute crises. We found that most of the messages exchanged are alerts containing location information and how spreading information is one of the most popular forms of participation. We then identified the small but influential role some users take curators. We presented their motivations and concerns. We then described the different strategies governments might have towards social media and what the outcomes might be.

REFERENCES

1. Al-Ani, B., Mark, G., Chung, J., and Jones, J. The Egyptian Blogosphere: A Counter-Narrative of the Revolution. Proc. CSCW 2012, (2012).
2. Al-Ani, B., Mark, G., and Semaan, B. Blogging in a region of conflict: supporting transition to recovery. Proceedings of the 28th international conference on Human factors in computing systems, ACM (2010), 1069–1078.
3. Althaus, D. Confessions in Mexico tourist deaths posted on YouTube. Houston Chronicle, 2010. http://www.chron.com/life/travel/article/Confessions-in-Mexico-tourist-deaths-posted-on-1707971.php.
4. Archibold, R.C. Armed Men Set Fire at Casino in Mexico, Killing 53. The New York Times, 2011. http://www.nytimes.com/2011/08/26/world/americas/26mexico.html.
5. Benkler, Y. The Wealth of Networks: How Social Production Transforms Markets and Freedom. Yale University Press, New Haven, CT, 2006.
6. Bichara, L. Notirex le da la bienvenida a BlogdelNarco. Notirex, 2011. http://notirex.com/2011/11/notirex-le-da-la-bienvenida-a-blogdelnarco/.
7. Booth, W. In Mexico's Nuevo Laredo, drug cartels dictate media coverage. The Washington Post, 2010. http://www.washingtonpost.com/wp-dyn/content/article/2010/08/01/AR2010080103481.html.
8. Bruns, A., Burgess, J., Crawford, K., and Shaw, F. #qldfloods and @QPSMedia: Crisis Communication on Twitter in the 2011 South East Queensland Floods. Brisbane: ARC Centre of Excellence for Creative Industries and Innovation, Brisbane, Australia, 2012.
9. Campos, M. ¿Por qué triunfó #internetnecesario? El Universal Blogs, 2009. http://blogs.eluniversal.com.mx/weblogs_detalle9097.html.
10. Castells, M. Communication Power. Oxford University Press, USA, 2009.
11. Castillo, M. Mexico: Citizen Journalism in the Middle of Drug-Trafficking Violence. Global Voices, 2010. http://globalvoicesonline.org/2010/05/05/mexico-citizen-journalism-in-the-middle-of-drug-trafficking-violence/.
12. Cave, D. Mexico Turns to Twitter and Facebook for Information and Survival. The New York Times, 2011. http://www.nytimes.com/2011/09/25/world/americas/mexico-turns-to-twitter-and-facebook-for-information-and-survival.html?_r=1.
13. Cheong, M. and Lee, V.C.S. A microblogging-based approach to terrorism informatics: Exploration and chronicling civilian sentiment and response to terrorism events via Twitter. Information Systems Frontiers 13, 1 (2010), 45–59.
14. Fabian, J.W. Google Kills Blog del Narco - Advantage Mexico News. 2011. http://www.advantagemexico.com/news/5064/google_kills_blog_del_narco.
15. Fernández, E. "Tuiteros" tiran nombre de parque. El Universal, 2011. http://www.eluniversal.com.mx/edomex/4657.html.
16. García Hernández, A. Twitter pulverizó el discurso público. La Jornada, 2011. http://www.jornada.unam.mx/2011/06/13/politica/003n1pol.
17. Garza, K. Extraño twitt de la Fiscalía de Coahuila pone en duda credibilidad de su cuenta - Vanguardia.

Vanguardia, 2011.
http://www.vanguardia.com.mx/extranotwittdelafiscali
adecoahuilaponeenendudacredibilidaddesucuenta-
692478.html.

18. Gómez Leyva, C. Twitter nos quiere matar de miedo.
Milenio, 2010.
http://impreso.milenio.com/node/8725469.

19. Gómez Leyva, C. El exitoso Blog del Narco. 2010.
http://impreso.milenio.com/node/8855061.

20. GShock112. Videos of mexican cartel executions
being removed for TOS. Liveleak, 2011.
http://www.liveleak.com/view?i=dcc_1317172941&co
mments=1.

21. Gutierrez, R. Leaking secrets, leaking blood. Boing
Boing, 2010.
http://boingboing.net/2010/09/14/narco.html.

22. Lotan, G., Graeff, E., Ananny, M., Gaffney, D.,
Pearce, I., and boyd, danah. The Revolutions Were
Tweeted: Information Flows during the 2011 Tunisian
and Egyptian Revolutions. International Journal of
Communication 5, (2011).

23. Malkin, E. Mexican Drug Gang Chief Reported Killed
in Matamoros. The New York Times, 2010.
http://www.nytimes.com/2010/11/06/world/americas/0
6mexico.html.

24. Mark, G., Bagdouri, M., Palen, L., Martin, J., Al-Ani,
B., and Anderson, K. Blogs as a Collective War Diary.
Proc. CSCW 2012, (2012).

25. Mark, G.J., Al-Ani, B., and Semaan, B. Resilience
through technology adoption: merging the old and the
new in Iraq. Proceedings of the 27th international
conference on Human factors in computing systems,
ACM (2009), 689–698.

26. Menchaca, A. Dispara inseguridad estrés
postraumático. El Norte, 2011.

27. Naaman, M., Boase, J., and Lai, C.-H. Is it really about
me?: message content in social awareness streams.
Proceedings of the 2010 ACM conference on
Computer supported cooperative work, ACM (2010),
189–192.

28. Nájar, A. Twitter, el inesperado juez en México. BBC
Mundo, 2012.
http://www.bbc.co.uk/mundo/noticias/2012/02/120202
_twitter_juez_mexico_an.shtml.

29. Okeowo, A. To Battle Cartels, Mexico Weighs Twitter
Crackdown. Time, 2010.
http://www.time.com/time/world/article/0,8599,19816
07,00.html.

30. Palen, L. and Vieweg, S. The emergence of online
widescale interaction in unexpected events: assistance,
alliance & retreat. Proceedings of the 2008 ACM
conference on Computer supported cooperative work,
ACM (2008), 117–126.

31. Roig-Franzia, M. Mexican Drug Cartels Leave a
Bloody Trail on YouTube. The Washington Post,
2007. http://www.washingtonpost.com/wp-

dyn/content/article/2007/04/08/AR2007040801005.ht
ml.

32. Sosa Cabrios, A. 'El Triángulo de las Bermudas'
mexicano. El Mundo, 2011.
http://www.elmundo.es/america/2011/04/14/mexico/13
02789244.html.

33. Starbird, K., Palen, L., Hughes, A.L., and Vieweg, S.
Chatter on the red: what hazards threat reveals about
the social life of microblogged information.
Proceedings of the 2010 ACM conference on
Computer supported cooperative work, ACM (2010),
241–250.

34. Starbird, K. and Palen, L. "Voluntweeters": self-
organizing by digital volunteers in times of crisis.
Proceedings of the 2011 annual conference on Human
factors in computing systems, ACM (2011), 1071–
1080.

35. Twitter. One hundred million voices. Twitter Blog.
http://blog.twitter.com/2011/09/one-hundred-million-
voices.html.

36. Valencia, N. Residents use social media to fight
organized crime in Mexico. CNN, 2010.
http://articles.cnn.com/2010-03-
08/tech/mexico.crime.social.media_1_microblogging-
cartels-social-media?_s=PM:TECH.

37. Zabludovsky, K. Mexico: Suspect Arrested in Casino
Fire. The New York Times, 2011.
http://www.nytimes.com/2011/10/14/world/americas/
mexico-suspect-arrested-in-casino-fire.html.

38. Mexico paper seeks cartel clarity. BBC, 2010.
http://www.bbc.co.uk/news/world-latin-america-
11370310.

39. Fiscal informa muerte de civiles en twitter.
Vanguardia, 2010.
http://www.vanguardia.com.mx/fiscalinformamuertede
civilesentwitter-574890.html.

40. Entre sombras. Vanguardia, 2010.
http://www.vanguardia.com.mx/entresombras-589883-
editorial.html.

41. Delincuencia organizada infiltrada en redes sociales.
BlogdelNarco.com, 2011.
http://archivo.blogdelnarco.com/delincuencia-
organizada-infiltrada-en-redes-sociales/.

42. Redes Sociales en México y Latinoamérica.
Asociación Mexicana de Internet, Mexico, D.F.,
Mexico, 2011.

43. Displacement due to criminal and communal violence.
Internal Displacement Monitoring Centre, 2011.

44. Exhibida la FGE con falsa alarma. Vanguardia, 2011.
http://www.vanguardia.com.mx/exhibidalafgeconfalsa
alarma-1182369.html.

45. Quinto año de gobierno: 60 mil 420 ejecuciones. Zeta,
2011. http://www.zetatijuana.com/2011/12/12/quinto-
ano-de-gobierno-60-mil-420-ejecuciones/.

46. For journalists, coverage of political unrest proves
deadly. Committee to Protect Journalists, 2011.

47. FiscalíaCoahuila (fiscaliacoah) on Twitter. 2012. https://twitter.com/#!/Fiscaliacoah.
48. Dir. de Gobierno REY (dirdegobreynosa) on Twitter. 2012. https://twitter.com/DIRDEGOBREYNOSA.
49. 'Tuiteros' se burlan de 'feisbukeros'. 2012. http://www.la-ch.com/index.php?option=com_content&view=article&id=10761:tuiteros-se-burlan-de-feisbukeros&catid=42:general&Itemid=62.
50. Sergio Sisbeles: El hombre de las 'malas' noticias. 2012.
51. Editor: Armed men attack Mexican newspaper office. CNN. http://articles.cnn.com/2011-11-06/americas/world_americas_mexico-violence_1_armed-men-newspaper-office-veracruz?_s=PM:AMERICAS.
52. Residents use social media to fight organized crime in Mexico - Page 2 - CNN. http://articles.cnn.com/2010-03-08/tech/mexico.crime.social.media_1_microblogging-cartels-social-media/2?_s=PM:TECH.
53. Shouting Fire in a Crowded Hashtag: Narco Censorship & "Twitteroristas" in Mexico's Drug Wars. ReadWriteWeb. http://www.readwriteweb.com/archives/shouting_fire_in_a_crowded_hashtag_narcocensorship.php.