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Social Media and Revolution: The Arab Spring and the Occupy Movement as Seen through Three Information Studies Paradigms

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Abstract
Using three Information Studies paradigms--the physical metaphor, cognitive metaphor, and social informatics--this paper discusses how researchers might approach the study of social media and revolution. Drawing from the Arab Spring and Occupy movements, with specific examples from Occupy Oakland, it provides potential research questions and methods that would be appropriate within each framework. It concludes by reminding readers that each paradigm is a tool that can be used to view a subject from a certain perspective, and that they should be chosen and combined based on the research topic and research questions. This approach allows us to envision the paradigms as lying along a spectrum rather than existing as discrete points that cannot be synthesized.

Keywords: social media, Arab Spring, Occupy Wall Street, Occupy Oakland, protest, paradigms, social informatics, physical paradigm, cognitive paradigm, research methods

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Social media and revolution: The Arab Spring and the Occupy movement as seen through three paradigms

INTRODUCTION

Every field has paradigms that inform the types of research conducted and shape the interpretation of results. Kuhn (1970) describes a paradigm as being the core theories and methods within that discipline, along with a shared vision of the types of phenomena that fit under the umbrella of a given approach. Some, like Raber (2003), argue that Information Studies is a field comprised of many paradigms that compliment and compete with each other, while others (i.e. Bates, 1999) seek to find a single paradigm that underlies a vast, complex, and interdisciplinary field of inquiry. The field of Information Studies (IS) is one which has moved from looking at information as tangible and unchanging to more recently allowing for perspectives that take into account the personal and the social contexts in which the individual exists (Raber, 2003). This spectrum of paradigms offers a rich array of viewpoints from which to observe information seeking and producing activities, and moving through each paradigm also allows a researcher to view the field holistically and choose from a variety of approaches before beginning a project.

The paradigms themselves can be viewed as "small worlds" in the same way that Chatman, Burnett, and Jaeger have envisioned them in the context of individuals' access to and appraisal of information: Burnett and Jaeger (2008) indicate that the small worlds in Chatman's studies "tend to be normative and tend to perceive the outside world through their own particular sets of filters that work to limit what information from the outside is admitted and accepted within the small world." (n.p.). Recognizing that each paradigm is but a lens through which to view an issue, it becomes possible for researchers to keep from becoming irreversibly tied to one approach and instead choose the paradigm best for understanding each topic, rather than molding the topic to fit a paradigm.

This is the approach the current paper will take: using three of the paradigms described in Raber (2003), the author will discuss how we might approach researching and understanding the role of social media in the Arab Spring and Occupy protests. This paper will examine the physical, cognitive, and social informatics approaches to discuss relevant research methods and questions. It provides a brief introduction to the movements and to how each paradigm might be used to study them, followed by an examination of a two-day period in the Occupy Oakland

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protests. The end goal is to open the door for researchers to explore these issues more deeply and to think critically about the role paradigms play in their own work.

While these movements are recent enough that little scholarly work has been published on them, one can still examine these movements through the paradigms to better understand how participants seek and organize information, and how they leverage technologies to increase the impact of protest activities. The protests stem from many of the same complaints: government corruption, lack of jobs and opportunities, and an increasing disparity in the distribution of resources (Adbusters, 2011; Malaki, 2011). As such, it makes sense to approaching their study with similar theories and methods.

It is important to research and understand how revolution and technology interact because we live in a time where political upheaval and social change are commonplace. Understanding the role social media plays in shaping revolution is a key to discovering how future movements might best learn from today's protesters, and the role and perceptions of individuals and groups within the protests. It also can help information professionals and technology developers to design better tools and services to meet the needs of their patrons and customers. Additionally, looking at social and political movements gives us a way to more deeply understand recent history and current events around the world.

A BRIEF OVERVIEW OF THE MOVEMENTS

The Arab Spring began in late 2010 in response to oppressive regimes and a low standard of living, beginning with protests in Tunisia (Noueihed, 2011; Maleki, 2011). In the news, social media have been heralded as the driving force behind the swift spread of revolution throughout the world, as new protests appear in response to success stories shared from those taking place in other countries (see Howard, 2011). In many countries, the governments have also recognized the importance of social media for organizing and have shut down certain sites or blocked Internet service entirely, especially in the times preceding a major rally (see The Telegraph, 2011). Governments have also scrutinized or suppressed discussion in those forums through accusing content creators of unrelated crimes or shutting down communication on specific sites or groups, such as through Facebook (Solomon, 2011; Seyid, 2011).

Part of the success of the movements comes not only from organizing via social media, but sharing insights with other protesters and learning from their experiences, such as what to do to reduce the effects of tear gas. Social media also created a community in which people could

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share news, sympathy, and support. Learning from the experiences of others and adapting this in real time is likely a great contributor to activists' success (Kirkpatrick and Sanger, 2011). In some countries, the governments are still in power (i.e. Shadid, 2011) and in others the protesters have successfully removed leaders or placed increasing pressure on them to resign (i.e. Burch, 2011). In most, if not all cases, violence has been used against protesters.

The Occupy movement in the United States has also faced opposition from officials. Occupy Wall Street began on September 17, 2011, called together by groups such as Adbusters and Anonymous. Inspired by the Arab Spring revolutions, protesters began camping in lower Manhattan to protest corporate greed and a resulting loss of financial wellbeing and opportunity for most of the population, as well as the loss of democratic representation by elected officials who are beholden to special interests. After the Occupy Wall Street camp was established, other protests began cropping up around the United States and eventually around the world. As of this writing there are over 100 occupations in the United States and over 1,500 worldwide (OccupyWallStreet, 2011; Adbusters, 2011; Anonymous, 2011).

Occupations have faced backlash from police and elected officials, in some cases resulting in violence against protesters. This includes the destruction of the original encampment in Zuccotti Park in Lower Manhattan. Protesters tried to get back into the camp, but a court upheld the order that they vacate (CNN Wire Staff, 2011). Even though the original encampment was destroyed, many protests are ongoing: the official statement released by the group was given under the motto: "You can't evict an idea whose time has come." (OccupyWallSt b, 2011). Other protests have met with violence, including those at University of California Davis and Berkeley, and in Denver, Colorado (Whipple, 2011; Siders & Minugh, 2011). Like the Arab Spring uprisings, the Pew Research Center indicates that Occupy has strong public support: many people in America agree with the protesters' attitude toward Wall Street (Kohut, 2011). This broad support is likely part of the protests' continued momentum.

Both the Arab Spring and Occupy movements have a number of approaches in common. Information about protests is organized on Twitter using hashtags (i.e. #feb17; see Libyan Youth, 2011). Hashtags are used both to coordinate planning for certain events or to tie one's tweets in with a larger discussion on a subject. Many groups also have a Facebook presence and websites (for examples, see Appendix A).

Another common theme is expressions of solidarity between protesters in different countries using social media. Appendix A shows screen shots of #occupyoakland tweets, which

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include not only relaying of information about the protests but expressions of support and solidarity from those in other places. While heavily used, these protests are not solely about social media; it is used as a tool to help connect protesters and relay a message to the outside world (Zogby, 2011), but the real power of the protests comes from the people wielding that tool. By studying social media as a tool using several paradigms, we can more fully understand its influence and use.

Research that focusing on social media exists, but only one work has been done on recent uprisings (Lotan, Graeff, Ananny, Gaffney, Pearce, and Boyd, 2011). The authors analyzed the flow of information on Twitter during a roughly one week period for the Tunisian and Egyptian uprisings. The datasets were analyzed to determine the types of users who posted regularly (called "key actor types") and other participants who engaged with the subject. Readers view results on a website, and can narrow by different themes uncovered in coding to understand the ways in which information flows between actors. Their findings indicate that news was co-created by bloggers and activists alongside journalists and suggests that Twitter re-creates journalism as a conversation rather than the expert telling of a story.

Most of the other research in social media has been done in business, as companies and researchers determine how it can be most effectively used (see for example Kaplan & Haenlein, 2010). Similarly, those in government are interested in social media, and research has been done in this area. Klang and Nolin (2011) studied the social media policies of twenty-six Swedish municipalities to learn how each one interacts with citizens and shares information through these channels. Others in computing and information studies have engaged with social media by looking at how it meets user needs, in one case through designing a system to locate high-quality content in Yahoo! Answers (Agichtein, Castillo, Donato, Gionis, & Mishne, 2008). The lack of a body of research regarding social media and revolution points to a wealth of future studies that could be done in this area.

Occupy Oakland

This paper looks more thoroughly a two day period in the Occupy Oakland movement to provide specific examples of how one might approach a line of inquiry into social media and revolution. October 25 to October 27, 2011 was a very active and volatile time for Occupy Oakland, and provides a wealth of information to discuss in this paper and enough resources to guide other researchers. Studying such a short time period is fruitful because it allows the

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researcher to examine their subject in depth, particularly since the medium allows for such rich and varied information to be produced and disseminated in a short period of time.

In the early morning hours of October 25, police raided the Occupy Oakland campsite, dismantling tents and arresting protesters. That evening, the protesters reassembled and the police attempted to disperse them with tear gas and rubber bullets. Many news outlets and blogs exploded with information about the incidents, and the city's mayor faced sharp criticism (Kessler, 2011; Romney and Lopez, 2011). There were a number of social media outlets through which one could obtain information about the happenings in Oakland, although the most thorough was the page that was produced by protesters was the group's website, which had a news release about the attacks as well as a continuously-updated ticker compiling #occupyoakland tweets (OccupyOakland, 2011).

In response to police actions, protesters reassembled and engaged in marches and discussions via social media. Protesters around the world rallied to show support for those in Oakland, including protesters in Tahrir Square (Egypt), who planned a protest to support Occupy Oakland (see Appendix A). In response to the outcry, Oakland's mayor responded to pressure October 27 and allowed the protesters to their original encampment near city hall (Walter, 2011). The outcry of a worldwide network of protesters to events in Oakland may have been behind this relatively fast response, and provides a helpful framework as we move into examining different paradigms.

PHYSICAL PARADIGM

The physical paradigm views information as a physical object, which is recorded in 'texts' (which can include other physical media, such as sound and video) and described using a language that focuses on physical characteristics of objects. These objects can be stored, organized, and retrieved as needed. The conception of information as being an observable phenomenon that manifests in a variety of ways is similar to theories surrounding universal phenomena like energy, and implies that it can be manipulated with technology. Additionally, this metaphor assumes that there is an objective reality that exists independently of human consciousness and perception, and that information exists within this realm. The physical paradigm was the basis for early work in Information Studies, in which the focus was on transmission, storage, and retrieval through the development of mechanized processes; these processes were seen as largely being separate from individual interpretation or social contexts

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(Raber, 2003). The physical paradigm is useful for studying social media because it allows us to envision information as a transmitted object and to articulate both what that information is and how it moves between parties, and can aid in the development of more useful tools for storage and retrieval.

The concept of information as an objective, manipulated phenomenon raises a number of interesting research questions when examining social media. For example, how do we define and classify 'objective' information when reading tweets or Facebook posts? Can we create a system to locate this information through summarizing vast numbers of tweets and pulling out only information about events that is corroborated by multiple participants? What shortcomings are there to this approach?

Additionally, social media sites update in real time--this raises questions about how (or whether) retrieval systems could be tailored to pull relevant results from a stream that is constantly being added to. One approach to study this would be to determine which hashtag one will use (i.e. #OWS for Occupy Wall Street) and then enter it into several hashtag compilers (Hashtags.org; Twapper Keeper). The goal would be to see if each returns the same result of providing all tweets on that subject, or if filters are in place (i.e. to remove spam). If results differ, one can ask how, and why? If results are different, how do these differences impact the flow of information?

Other studies could use Twitter hashtags to measure the impact of a certain piece of information. Such a study could draw from Agichtein et al. (2008) and their system designed to locate high-quality information in Yahoo! Answers. Instead of using Yahoo! forums, researchers could create a system that focuses on compiling tweets with a certain hashtag that have been retweeted most frequently. Once researchers learn what information is most widely shared, they can move into other paradigms to try to understand why a given tweet is deemed relevant or interesting.

Researchers could also study the Twitter archive being compiled by the Library of Congress (Raymond, 2010). A researcher might search for information about specific revolutions with the following questions in mind: What information is returned when searching? Is it every piece of information on that topic? How does the system determine ‘relevance’: can it separate opinion-based tweets from ones updating followers on current events? How can the system be improved? How are tweets organized?

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The Occupy Oakland protests provide additional examples for future research. For example, during and after the raids on the encampment, the Twitter feed and the Occupy Oakland website were updated, whereas the Facebook page had not been updated for five days. Another, smaller Facebook page, called Occupy "Oakland" together was updated, however (see Appendix A). By understanding information as an object flowing through channels, developers could create a system that compiles information from multiple social media streams. Researches could ask: How does posting information in one stream (ie Twitter) versus another (ie YouTube) impact the ability to retrieve posts? How does one retrieve all relevant information from a disparate array of user-generated posts, such as videos? This could be combined with other paradigms to learn about why content creators are posting in certain media or uncover trends in the types of information posted in certain channels.

Additionally, the physical paradigm allows us to look at how the spread of information is helped or hindered by search engines. In several instances, the pages with the most followers were not the most relevant and timely information. One example would be the Occupy "Oakland" Together Facebook page versus the Occupy Oakland page. Similarly, Russia Today combined two videos of tear gassing at Occupy Oakland that were taken by other individuals with much less well-known YouTube channels. Within hours of posting, it had received over 300 views, while each video the footage came from had been seen about 200 times, even though they had been posted the day before. Other news sites picked up the Russia Today video (i.e. Good, 2011), resulting in an unknown number of additional views. In search engines that use PageRank (Google) or similar algorithms, how does this impact what information is spread and what remains hidden in search results? How does the number of subscribers, posts, or followers impact what information is retrieved? Moving into other paradigms, one could ask how it impacts users' perceptions of events being portrayed.

One research-driven work is a melding of the physical paradigm with the other paradigms that follow in this paper. This is Lotan et al.'s (2011) study of the flow of information on Twitter during the Tunisian and Egyptian uprisings. It contains elements of the physical paradigm in that the focus is on how information flows and on designing a retrieval system to locate high-quality content. It goes beyond this to include elements of the cognitive paradigm (the impact of items through re-tweeting, which relies on the user's determination of relevance), and social informatics (a holistic view of how all these users' posts fit into a larger discourse).

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A similar approach could be taken when examining other revolutions, raising questions such as 'how do journalists and activists share information about the Occupy protests, and where do their approaches converge and diverge?' One could ask similar questions about other aspects of revolutions, such as portrayal of events on the Facebook pages of elected officials and police departments versus those of Occupy-related pages. Examples such as this study show the value of incorporating elements from multiple paradigms and illustrate the importance of considering what each approach has to bring to a study.

COGNITIVE PARADIGM

The cognitive paradigm arose out of criticism of the physical paradigm, defined by Raber (2003) as "...premised on the assumption that we can distinguish between tangible, formal objects, and expressions that possess the quality of being informative and intangible cognitive phenomena of knowing and being informed." (p. 91). Critics argue that it is impossible to separate communicative symbols from the information they signify, and offer a different approach. While the physical paradigm envisions an object's informative nature as being autonomous from humans, those working in the cognitive metaphor argue that it is situational. Even if an object might contain inherently informative attributes, those attributes do not inform (nor can we describe the ways in which they inform) without being interpreted. Thus the focus is on how the individual appraises information, rather than on determining the objective nature of the information itself (Raber, 2003).

The cognitive metaphor's usefulness in studying social media lies in its provision of a framework through which we can study how protest-related content is interpreted and evaluated by the individual, and would mostly likely be employed through surveying individuals to learn how they interpret and appraise information. For example, a researcher could look at information that is updated in real time (social media) versus that which is updated somewhat less frequently (news articles). How does this alter a person’s understanding of world events and the ways in which we pursue further information about them? What are the perceived benefits and drawbacks of each?

Dervin's (1998) sense-making theory envisions the user as an active participant in the information seeking process, and includes many dynamic perspectives (such as 'verbing') to describe how users articulate their needs and seek to fulfill them. Researchers might examine how well this model overlaps with social media use: do Twitter users know how to articulate

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their needs and locate relevant information in a more 'informal' environment comprised of digital, community-generated information rather than one in which an information broker such as a reference librarian can be readily turned to?)

The cognitive paradigm could also be useful for studying the Russia Today video mentioned earlier. Because the original creators of the videos had fewer followers than Russia Today, their impact was smaller. The edited video was also made by a recognized news organization rather than individual activists. Using the cognitive framework, researchers can survey or observe users and collect data about where they look for media related to different aspects of the protests. Such an approach allows us to ask questions about how people choose and appraise news sources, or whether those who saw the original videos versus the edited video have different perceptions of what happened. This approach could also be used to understand user's interpretation of events based on coverage from a variety of news outlets. Researchers could also look at the tone and wording of social media posts versus that of news articles to see how they align and diverge. Research in Psychology, Political Science, and Linguistics would be helpful for understanding how the framing of events shapes the perception of those events (see Iyengar, 2005).

The cognitive paradigm also allows us to look at how activists, journalists, and other parties engage with the issues. Such work could draw heavily from Jenkins et al.'s (n.d.) notion of participatory cultures, which have low barriers to participation and engagement, strong support for sharing, and informal mentorship. Such cultures take on many forms, including membership in online communities (i.e. Facebook), expressions (producing new creative forms through mashups), collaborative problem solving (Wikipedia), and circulations (blogging and podcasting). They argue that each of these forms of engagement has advantages, and many of them are already prevalent. While their study focuses on adolescents' use of technology, future studies could look at how protesters utilize social media, and how they see each form of engagement as helping or hindering their work.

The cognitive paradigm could also be useful for understanding trending topics on Twitter. Did many of these individuals perceive this as being a good time for posts of support and solidarity because of the increased presence of the topic in their news feeds? Were there other factors at play? One could also look at the impact of a certain piece of information through how often it is retweeted. Are there trends based on the types of content or the content created by certain individuals? If so, what is it about that subject or person that is considered relevant? This

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approach could be melded with social informatics to broaden researchers' understanding even further by taking into account how the perception and discussion of events might change between groups.

For example, the number of people talking about #occupyoakland rose and fell dramatically over a two day period. Tweets using the hashtag dropped dramatically on the morning of the 26th, rising slowly the rest of the day. That evening, tweets about #occupyoakland mostly focused on the newly gathered crowds. The subject became more frequently discussed later that evening, although not to the extent it had become during the attacks. Many tweets concerned the large gathering of protesters in response to the police brutality of the previous evening. The cognitive metaphor can help us understand why individuals consider a topic (ie police brutality) important in one context but not another, or if other factors are at work (i.e. has something changed in users' access to or interpretation of events, are are there simply more users online engaging at that moment?)

Archie Dick's (2006) article examines the biases of the cognitive approach, arguing that this model is biased toward industrialized cultures. Most importantly, it reminds researchers that the approaches and frameworks useful in industrialized countries may not be appropriate or useful elsewhere. Both Dick (2006) and Talja (1997) are critical of cognitive models that do not take into account unequal distribution of resources and unequal opportunities, and that privilege certain voices in the field over others. These articles highlight the importance of including the research and experiences of those most affected by recent uprisings within published literature. Researchers in the United States might approach this by building connections with researchers in other countries or by engaging in conversations with those involved with movements locally who might be interested in sharing their research. Collaborating in such a way will not only be useful for sharing different experiences, but also is an approach that is open to all methods. It would be particularly useful with grounded theory, wherein researchers can build theory out of their observations of information seeking and creating activities within revolutions, and use that to fill in gaps in the current body of theories that Dick and Talja criticized.

SOCIAL INFORMATICS

Social informatics is a perspective that arose in response to a perceived 'missing piece' in earlier paradigms. While the physical and cognitive metaphors engaged with information as a thing and our interaction with it, they failed to acknowledge how we interact with each other.

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Sawyer and Rosenbaum (2000) provide a useful overview of social informatics. They define it as "the interdisciplinary study of the design uses and consequences of information technologies that takes into account their interaction with institutional and cultural contexts" (p. 90). They consider this approach to include three orientations for studying information and communication technologies: the normative (recommending alternatives to current models used by developers, information professionals, and policy makers), the analytical (create theories related to technologies by conducting empirical studies), and the critical (the study of a variety of perspectives related to these technologies). All three could be applied to the study of social media and protest. The normative approach could be useful for those hoping to develop or disseminate more effective social media tools, the analytical would be useful for discussing trends in social media use and building relevant theories, and the critical would allow researchers to look at how social media use is viewed by non-users or how revolutions are discussed within social media.

Social informatics is incredibly useful for studying the Arab Spring and Occupy protests because they consist of large, technologically-savvy groups. One of the frequent claims about these protests is that they are different from other protests before them largely because protesters are connecting through social media (Madrigal, 2011). Social informatics allows researchers to look at social media use and determine how individuals are connecting to each other and staying updated about the events around them. It has also been suggested that the tenacity of these movements is due in part to the fact that people are recording most everything, thus capturing footage of events that may not have been caught by news crews (Madrigal, 2011). A researcher might compare coverage of the current protests with others by analyzing historical sources or conducting in-depth interviews with those involved in past protests to learn what the news would cover and how protesters would gather and disseminate information. This could then be compared to information surrounding current protests.

One could also compare the approaches of different bloggers in order to understand what has shaped their perspectives. For example, some shared their perspectives as individuals involved in the Oakland protests (Bady, 2011), while others looked at Occupy Oakland as part of a tradition of resistance and social action (Boog, 2011). Trying to understand the social contexts in which these individuals exist would allow researchers to talk about how those social contexts might shape their technology use and perspectives. For those who are also concerned about repercussions, what tactics do they use to separate their activism from their identities

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(pseudonyms in online environments, wearing face coverings, etc.)? In-depth interviews or content analysis would both be useful for learning about these topics.

Researchers can not only study the context of the individual, but the treatment of a topic by a group and how that can be compared to other groups. For example, the OccupyMARINES Facebook page provides a space for servicemembers to voice their support for the Occupy protests and to post calls for assistance. During the Oakland tear gassing, many posts came in from around the country as members begged servicemembers to go to the protests to help protect citizens (see Appendix A). The content of this page could be discussed alongside that of nonmilitary Occupy pages or alongside military pages not affiliated with Occupy.

Murat Karamuftuoglu's work (1998) argues that social informatics addresses shortcomings in examinations of Information Retrieval (IR) that do not include discussion of it within its larger context, saying we cannot look at it without seeing how it is influenced by society. His vision of IR is one in which community members identify, evaluate, and share information. This vision is seen in interactions on Twitter over the past year as people have coordinated their protest efforts on a local and national scale and shared their knowledge and advice with revolutionaries elsewhere (see Kirkpatrick and Sanger, 2011). Perhaps the most useful point for researchers is Karamuftuoglu's rejection of the notion that "information seeking is thought to be a private labor" (p. 1074). Through the use of hashtags, information creators are compiling their tweets by subject, thus engaging in a collaborative creative effort that also allows for easy retrieval. A researcher might approach a study of this collaborative process in a variety of ways.

These could be as simple as using quantitative methods to tally up the frequency of different concepts, or as complex as using qualitative methods and conducting in-depth interviews with those who are creating knowledge most frequently or whose knowledge is disseminated most widely (i.e. through retweeting) to determine their approach to creating knowledge (such as asking questions about what prompts them to tweet information--events in their immediate surroundings? Their ideas about movements more broadly? Synthesizing information produced by others?) This approach could be useful for seeing how information is shared by those who are on the scene and how it is synthesized, distributed, and consumed by others who are physically removed from the revolution (such as National Public Radio journalist Andy Carvin, @acarvin on Twitter, who has gained a large following for his ability to locate and share information about the Middle East uprisings.)

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One could also draw from Chatman's (1996) work on information worlds to understand how protesters' use of social media aligns with her conception of information-poor and information-rich life worlds. Does harnessing certain technologies make one information-rich, or do they have to be information rich to begin with to get the most out of them? How does her conception of "insiders" (information rich) and "outsiders" (information poor; also usually those with lower socioeconomic statuses) align with the groups identified by protests movements? For example, to what extent do the "insiders" consist only of the one percent and the "outsiders" the 99 percent, and to what extent those who are not considered wealthy enough to be part of the one percent but who control access to information and resources in a way that maintains the status quo? If so, what does this say about our current information infrastructure, and can that infrastructure be changed? Additionally, how do information-rich persons use and appraise social media when compared to information-poor? Are there places in social media discussions for both groups?

The tenacity of protesters' information wealth (or poverty) is also a worthy subject of study. For example, during the Egyptian revolution, Internet service was stopped in an attempt to hinder protests. As a response, protesters turned to older technologies such as citizen band radios, fax machines, and modems to connect and share information (British Broadcasting Channel, 2011). Researchers might look at how this shift in technology impacts one's information world and seeking behaviors. Researchers could also look at access, information needs, and information worlds across a variety of protests, including those where Internet service might be interrupted but a network of other technologies is not in place. Chatman (1996) also argues that those in power (insiders) seek to stay in power, so research on their changing information worlds in response to pressure might also be worthwhile. All of these can be combined with other paradigms or taken in a variety of directions, ensuring a rich stream of future research that can engage scholars from a variety of fields.

CONCLUSION

Each of the three paradigms discussed in this paper comes with its own strengths and limitations. The physical paradigm helps us envision the movement of information and how to improve retrieval, but does not take the role of perception or social context into account. The cognitive paradigm is helpful for understanding how the individual chooses and interprets information, but is limited in how well it helps researchers understand groups or the role of the

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individual within a larger context. Social informatics addresses those concerns, but may be too broad or complex for some applications.

While the goal of this paper has been to discuss each paradigm's usefulness in understanding important current events as they shape our world, it is hoped that readers will also consider the value in drawing from multiple approaches and will understand the importance of tailoring a method to a question, rather than the other way around. Viewed in this way, much like the information worlds described by Chatman, Burnett, and Jaeger (1996; 2008), each paradigm is seen as a way in which to view and better understand reality, but also as something that responds to the needs of the researcher and the changing demands of research. Using this perspective, we move away from envisioning paradigms as discrete principles, in which we shift from one to the next in a single direction. Instead, they can be seen as existing on a spectrum: all are related and grew from each other, and all have a good deal of overlap. With this mindset, we can move along that spectrum or broaden our focus to include multiple paradigms on the spectrum as our research needs dictate.

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Appendix A: Screen Shots of Occupy Oakland Social Media Pages, 10/25/11-10/27/11

Facebook Pages

The Facebook page operated by Occupy Oakland. Retrieved from https://www.facebook.com/#!/pages/Occupy-Oakland/143158405783305 (8:30 PM, October 26).

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Another Occupy Oakland-related page, updated more recently after the tear gassing incident. Retrieved from https://www.facebook.com/#!/pages/Occupy-Oakland-Together/164079930345471 (8:36 PM, October 26).

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Samples of Oakland-related conversation on the OccupyMARINES Facebook page. Retrieved from https://www.facebook.com/#!/pages/OccupyMARINES/246310432083819 (1:40 PM, October 26).

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Samples of Oakland-related conversation on the OccupyMARINES Facebook page. Retrieved from https://www.facebook.com/#!/pages/OccupyMARINES/246310432083819 (1:40 PM, October 26).

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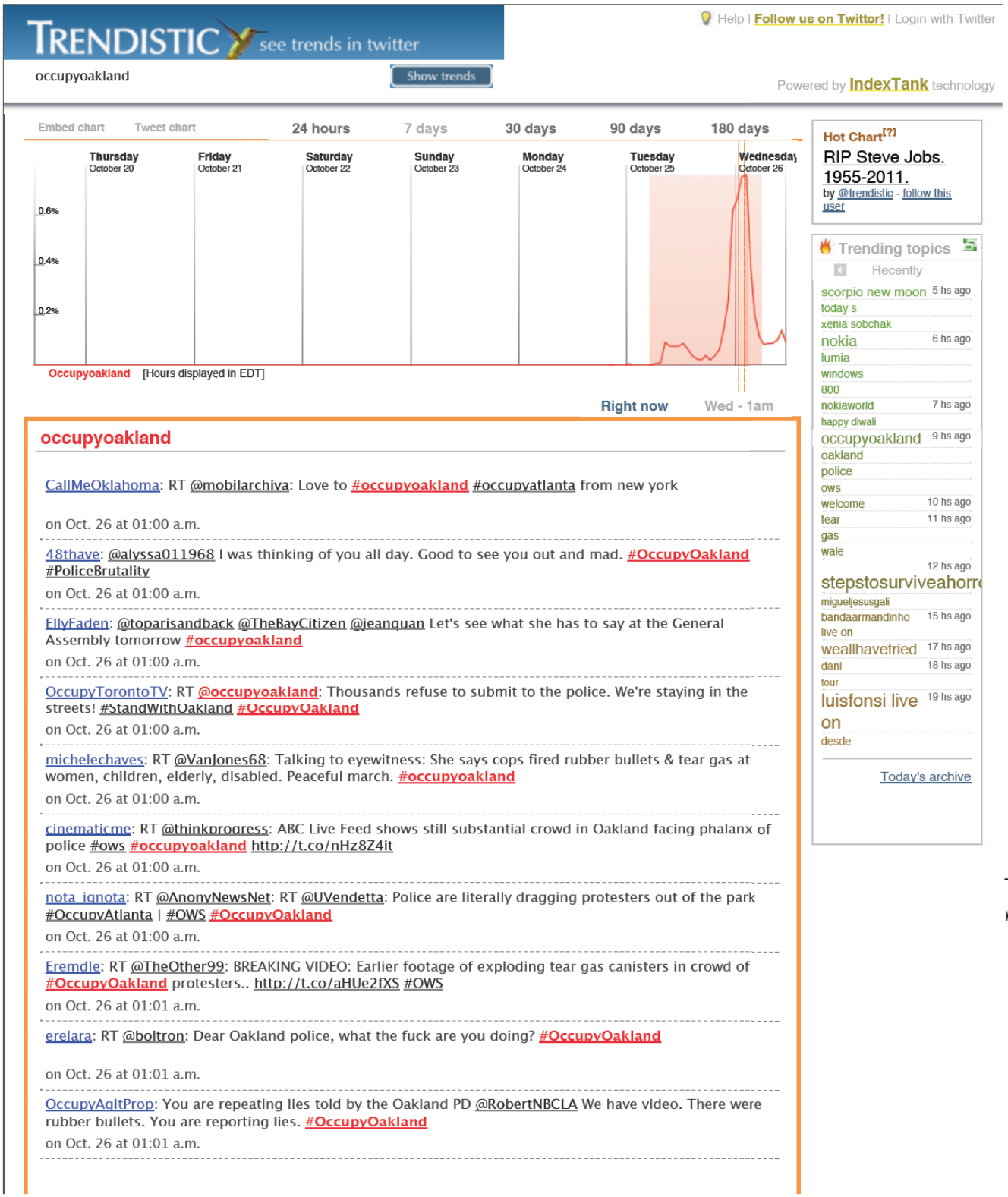
Twitter Posts

(All posts compiled using Hashtags.org: http://hashtags.org/occupyoakland)



Tweets from October 26, 1:00 AM. Retrieved October 26, 11:00 AM.

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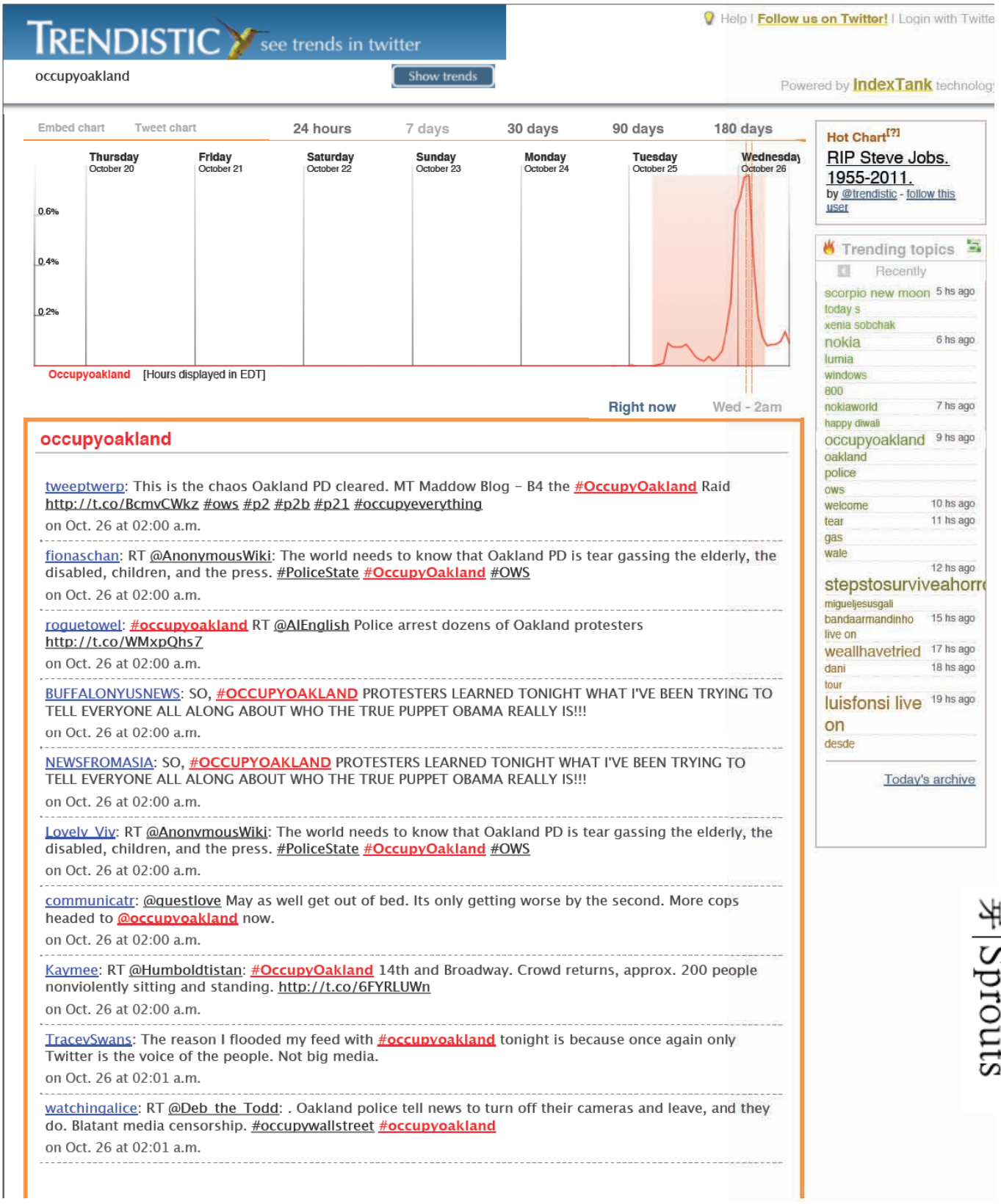

Tweets from October 26, 2:00 AM. Retrieved October 26, 11:00 AM.

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