CHAPTER ELEVEN

Using Network Analytic Tools to Teach Social Media Impact on Citizen Journalism

K. HAZEL KWON

Journalism scholars have observed the rise of citizen journalism in the past two decades. Debates have revolved around how to define citizen journalism as a counterpart to the traditional form of professional journalism. The empowering potential of citizen journalism was particularly highlighted in the early and mid-2000s, during which a few landmark events lit up the power of online social networks in facilitating citizen engagements in news production and dissemination (Bruns, 2005; Chang, 2005). Discussions have ranged from attributing citizen journalism to a subversive collective power that could take on the mainstream news industry, to differentiating it from mainstream journalisms as a hyper-local reportage or as a digital version of community or church newsletters, and to trivializing it as a collection of amateur musings (Jarvis, 2008; Lemann, 2006).

Along with the ubiquity of social media services in recent years, however, ordinary citizens' participation in creating and distributing news has become routine to the extent that the notion of "citizen journalism" no longer warranted a radical connotation. Since the rise of social media, the debate about the raison d'être of citizen journalism appears to have become somewhat outdated since ordinary user engagement in the news propagation process (such as re-creating, retelling, or re-disseminating), either deliberatively or unwittingly, has become much easier and plebeian compared to the previous online environment. Nonetheless, the prevalence of layperson involvement in the process of news propagation has not been translated into the frivolity of roles played by citizen journalism for social change. On the contrary, social media has allowed citizens to conveniently contribute in creating a

new genre of news streams, often referred to as "affective news" (Hermida, 2010; Papacharissi & de Fatima Oliveira, 2012), into which ostensibly discrete types of information—such as factual news, emotional public utterances, pundit commentaries, and interpersonal casual conversations—have been blended and converged (Papacharissi & de Fatima Oliveira, 2012).

The role of citizen journalism has grown even greater and influential for political mobilization as evidenced by many contemporary social movements (Bennett & Segerberg, 2012; Castells, 2013). Likewise, citizen participation in social media information streaming has become critically important in collective sense making in times of crisis when mainstream or official sources of information might not perfectly function (Oh, Agrawal, & Rao, 2013). For example, moments after the Boston Marathon bombing incident in April 2013, the Boston police blogs crashed, cell towers were overloaded, and communications broke down. At that time, according to Cheryl Fiandaca, chief of the Boston Police social media department, Twitter became the communication lifeline between citizens and public officers through which Boston Police could spread public safety information, answer requests for information, and react to misinformation in collaboration with citizen reporters (Fiandaca, personal communication, 2013). In this regard, journalism students in recent years have been playing a dual role, both as future journalism professionals and as informed citizens whose communication activities construct an important part of contemporary journalism ecology. Understanding the emergent media environment could help prepare students to carry out the dual roles more judiciously. This chapter introduced one of the methodological approaches in teaching the networked media environments, focusing in particular on a structural analysis of online social networks. Specifically, the chapter discussed how network analytics could be incorporated into the pedagogy of citizen journalism education and introduced a user-friendly, free computing program, NodeXL, as a useful tool for hands-on learning of social media networks in classroom.

In sum, using a network analytic tool such as NodeXL helped journalism students learn information diffusion processes among ordinary online citizens particularly via social media platforms. Provided that information dissemination has been a nontrivial part of citizen journalistic activities as well as the information landscape in a networked individualism society, understanding online network structures that transmit news items was an insightful learning agenda for journalism students. Network properties such as centrality, density, and clusters could be easily explored by using social media data retrieved from NodeXL.

LITERATURE REVIEW

Citizen Journalists as Networked Individuals

A general consensus has been that citizen journalists might play a distinctive role from professionals in that they voluntarily participate in at least one of the stages of news content creating, processing, and distribution in forms of online activities (Bruns & Highfield 2012). While early discussions have underscored the "alterity" imbued in the notion of citizen journalism, with the imagery of grassroots movements among rebels against the corporate-run media system, Goode (2009) pointed out that such heroic narratives hinder students from deeper understanding of the ways in which contemporary journalism has been shaped.

Goode (2009) stated that journalism "is essentially a craft of re-telling stories rather than simply disclosing them" (p. 1290). The retelling practice should not be divorced from the process of public sense-making and construction of meaning. In this sense, ordinary online users' practices of remixing and redisseminating existing mainstream media contents must not be disregarded from the discourse on citizen journalism. Dvorak (2006) supported this claim by bringing out the notion of meta-journalism, which pertained to online user activities that virally mutated extant news contents including rating, commenting, tagging, sharing, or reposting. In a similar vein, gatekeeping literature has observed the emerging role of end users, or audiences, in the chain of information processing (Barzilai-Nahon, 2008; Kwon, Oh, Agrawal, & Rao, 2012; Shoemaker & Vos, 2009) and highlighted how networked audiences' sharing activities affected the information flow. For example, Kwon et al. (2012) demonstrated that news about international political conflict had spread among the online public via redistribution processes in social media platforms rather than via direct acquisition from mainstream news websites. Kwon et al. (2012) highlighted the potential that networked citizens could possess in reinforcing or disrupting news flows. More recently, Neuman, Guggenheim, Jang, and Bae (2014) used big data from various online news sources to illustrate that social media users' metajournalistic activities could reversely affect the agenda setting of issues in the mainstream media. Furthermore, scholars have emphasized the impact of users' networked sharing on journalism by referring to it as "audience gatekeeping" (Kwon et al., 2012; Shoemaker, Johnson, Seon, & Wang, 2011; Shoemaker & Vos, 2009) or "intermedia agenda setting" (Meraz, 2011; Sweetser, Golan, & Wanta, 2008).

Citizen journalism has not been necessarily rebellious against corporate influence In contrast, much of these user engagements have leveraged profit-driven social media sites. Pew Internet research (2012) indicated that the majority of U.S. adults were exposed to and engage in disseminating political news via commercial social networking sites, which accounted for many top websites that were most traffi ked throughout the Internet sphere (Top, 2014). Goode (2009) contended

that user activities in these sites were a nontrivial part of citizen journalism practices, simultaneously benefited and constrained by network computing capabilities and profitabili y of social media corporations.

A large portion of recent citizen journalism activities has embraced metajournalistic practices such as commenting, sharing, liking, reposting, and so forth. The acts of metajournalism have mostly been occurring in popular, commercial social media platforms, for example, Facebook, Twitter, YouTube, Google Plus, and Instagram. These social media platforms have been the core enterprises in contemporary media environment. Here, user networking has been an essential common feature across different social media platforms. Without being connected to one another, citizens could not have shared perspectives on what their favorite news item was, why they liked it, what other news items were related to it, and how to re-create new content based on it. In other words, citizen journalists could only be prolific as networked individuals (Wellman et al., 2003). Social media became an indispensable tool for citizen journalists by conveniently providing interactive opportunities with both already known social contacts as well as the broader public.

Social Media Network Analysis with NodeXL

According to Rainie and Wellman (2012), the proliferation of networked individuals (and networked individualism) was not solely caused by communication technology innovations. The steadfast societal changes toward greater social and physical mobility, globalization, and blurred community boundaries accounted for the ongoing shift from bureaucratic modernity into networked individualism. Nonetheless, the recent Internet and mobile revolution evidently accelerated this transition. Especially in the field of information and creative industry, the role of networked individuals has become even more prominent as their participation has collectively constructed new forms and channels for knowledge and information distribution. Citizen journalism could be one example of these products.

In this sense, understanding social network structures that underlie news dissemination could be a valuable learning objective for contemporary journalism education. Since many social media services have been operated by collaborations among computer programmers based on open sources or open codes to some degrees, such openness enabled researchers and learners to access various social media data and better understand, for example, how users were interconnected with one another and how such interconnectedness facilitated the flow of information. While some students might have been equipped with programming language skills to utilize the Application Programming Interface (API) to get such data, the majority of journalism students might not be experts in computer programming. Hence, accessing such data could be a daunting task despite the acknowledgment of the necessity and the value of understanding the dynamics of social news dissemination.

To alleviate these challenges, certain software programs have become freely available in the recent years to provide non-experts with the tool for data access and analysis. This chapter focused on one of these freely available software programs, NodeXL, which has been created and maintained by a collaborative academic research group since 2011 (Hansen, Shneiderman, & Smith, 2011). NodeXL (2014) was a free, open-source template for Microsoft Excel, which allowed users to retrieve social media data, visualize the network of online users or news topics, and descriptively analyze characteristics of the network. NodeXL's interface was similar to conventional Excel templates.

The NodeXL website maintained an active network of scholars and learning community and also provided useful teaching resources. The usability of NodeXL was noteworthy for two reasons. First, it was based on a Microsoft Excel template, in which non-programmers could easily learn the interface designs and adopt functionalities for empirical explorations. Second, the program incorporated the plugins of several popular social media services, including Facebook, Twitter, LinkedIn, Flickr, into its platform, making it easy to access such social media data. Once these data were retrieved from social media platforms to NodeXL, students could readily conduct descriptive content and network analysis and visualization. NodeXL was intended to apply basic graph-theoretical network analysis to social media data. For a graph-theoretic understanding of the network, some basic knowledge regarding network constituents and measurements was essential. More details regarding the network constituents and measurement properties follow in the Applications section.

METHOD

A course titled Social Media Networks exemplified how the use of the network analytic tool could be incorporated into teaching a journalism undergraduate major. A network-based perspective played an increasingly important role in students' understanding of contemporary communication process. Especially, along with the popularity of social media, social networking has become a key term that characterized online information consumption and dissemination.

The course has been offered every spring semester since 2013. It was a computer lab–integrated course and each student needed personal guidance to some extent. Therefore, the class was kept to a small or mid-size with no more than 40 students. The course accomplished three learning objectives. First, students learned the role of social technologies in shaping citizen journalism within a larger societal context. Second, students acquired hands-on skills to analyze and interpret the structure of social media news and user commentaries. Third, students enhanced their self-awareness as citizen journalists in digitally networked global communities.

While the course was designed for an upper-level undergraduate course, it could be modified as a graduate-level course depending on the difficulty of the analytic problems the course intends to cover.

Keeping the networked media environment in mind, the course was designed into two parts. The first half of the semester aimed at theoretical learning: students were exposed to theoretical concerns and issues about the role of social technologies in evolving networked society, in particular how online networks were intertwined with media organizational changes and information consumption and creation processes. During this part of the semester, selected reading materials pertinent to social media–driven citizen journalism were assigned to students. Students were required to read the texts, attend lectures, and actively participate during in-class discussions. Students also performed home assignments including documenting a 24-hour log of their communication activities and media consumption and writing a personal essay after spending a day without using social media. The evaluation for this first part of the semester was based on two essay exams that covered lectures and readings, in addition to in-class activity participations and the quality of home assignments.

The second part of the course was methodological. During the second half of the semester, students learned social media network analysis and visualization (by using NodeXL) as part of citizen journalism training. The Applications section below mainly discussed this training. During the second part, students learned about the fundamental social network analytic properties and applied these properties to analyze social media data by using NodeXL. Students were trained intensively on how to use NodeXL to retrieve social media data from Facebook and Twitter, create and interpret network analytic results from the data, and visualize the network structure. During the training phase, each student's performance was reviewed on a weekly basis to make sure that students fully understood the training materials of the week. The evaluation of the second part was based on the weekly reviews and two assignments described in the Applications section below.

While the rest of this chapter mainly described the analytic training, the theoretical discussion was as equally important as the hands-on training in promoting the understanding of the relationship between social media uses and the process of media content dissemination. During the first half of the semester, students had learned about networked individualism theory (Rainie & Wellman, 2012), audience gatekeeping theory (Barzilai-Nahon, 2008; Shoemaker & Vos, 2009), intermedia agenda setting theory (Meraz, 2011; Sweetser et al., 2008), and the concept of metajournalism (Goode, 2009). Through networked individualism theory, students learned how sociological changes have contributed to the advancement of communication technologies and mobile media. Students were also encouraged to view online information sharing practices not just as media consumption behaviors but also as a defining characteristic of being networked individuals. Theories of meta-

journalism, audience gatekeeping, and intermedia agenda setting were introduced to demonstrate the emergent roles of news audiences and the empowerment of citizen journalists in diversifying journalism industry. After learning about such theories, the class reviewed recent case studies that exemplified social changes promoted by social media–driven citizen journalism such as the Arab Spring, the Occupy Wall Street movement, the Iceland Revolution, the Hong Kong Umbrella protest, and so forth.

The first part of the course—lectures on citizen journalism–related theories and case studies—could be flexible and versatile depending on the depth and width of knowledge of the instructor and the social currency of relevant issues. That said, training on network analytics were more technical and required the use of a predefined software program in learning processes. Therefore, demonstration of training outcomes in the next section was intended to provide insights for instructors interested in incorporating network analytic components into their courses.

APPLICATIONS

Social Network Analysis: Basic Concepts and Properties

Understanding basic network constituents and measurement concepts were prerequisite of leveraging social network perspective to train students on citizen journalism. In this course, students first learned two essential network constituents: nodes and edges. *Nodes* (interchangeably called *actors* or *vertices*) referred to the entities that constitute the network. While nodes commonly referred to individual persons, the unit of nodes could be defined in various ways including nonhuman entities depending on the research context. For example, nodes could represent media outlets, websites, and organizations. The more nodes included in the network, the larger the network size. Another element was *edges* (interchangeably termed as *links*, *ties*, or *relationships*), defined as the connections between a pair of nodes. Again, the substance of edges could be different depending on the topic of interest. It could represent, for example, friendship, communication frequency, node similarity, co-commenting, hyperlinking, and many others. For example, in Twitter, edges could represent who retweeted whom (retweeting relationships) or who mentioned whom (mentioning relationships).

To leverage the NodeXL program effectively, students needed to understand not only the nature of these network elements (i.e., what constitutes nodes and edges) but also the measurement properties widely used in the field of network analysis. In this course, the three most popularly used network properties were taught (committed learners were strongly recommended to study other available measures that help explore different aspects of network structures): "centrality,"

"density," and "clusters" (Wasserman & Faust, 1994). These three properties were chosen since they were the most widely used in understanding a variety of topics discussed among the journalism community, such as how to identify opinion leaders in the online personal networks and through which relational channels news stories could be spread in a social media platform.

Centrality. The centrality concepts "attempt to quantify the prominence of an individual actor embedded in a network" (Wasserman & Faust, 1994, p. 169). Students were educated on the centrality measures representation of how importantly an individual was positioned in a given network. Different types of centrality could be measured based on varied definitions of "important positions." First, an individual could be understood to be important if he or she had many direct edges with others (defined as degree centrality). Specifically, in-degree centrality refers to the incoming direct edges from the others' nominations; out-degree centrality refers to the outgoing direct edges from the focal actor to the others. Alternatively, a focal actor could be considered important if he or she had a direct connection to highly influential people who had a high degree centrality (defined as eigenvector centrality). For another definition of centrality, an individual could be considered important if he or she frequently lied on the paths between the other individuals (defined as betweenness centrality). According to Wasserman and Faust (1994), betweenness centrality "represents whether a particular actor might be able to control interactions between pairs of other actors in the network" (p. 188).

Different centrality measures could be used depending on situations. For example, if the news issues were hyperlocal, individuals who had many direct connections (degree centrality) in their local neighborhood might play an important role; at other times, people with high betweenness centrality might warrant attention especially if sensitive information were to be spread between two discrete social groups. In this case, people with high betweenness centrality would be likely to play as gatekeepers. In other cases when there was a need to mobilize resources for collective actions, identifying individuals with a high eigenvector centrality might be efficient since recruiting them would allow the campaigner to leverage more influenceability.

Density. Another important property could be the measure of density, referred to how densely members in a given network were interconnected. Computationally, it was the proportion of existing edges out of the maximum number of edges possible in a given network. The range of density value could be between zero and one, with the value of zero meaning no connections at all among the nodes, and the value of one meaning that every node is connected to every other node. Social media networks have shown much lower density values (close to zero) than interpersonal networks because the network size in social media would be generally much larger than in an interpersonal setting.

Examining network density would help understand different network structures across various social platforms. For example, suppose that Facebook network showed a higher density compared to Twitter, given the same network size. The result would suggest a different social mechanism underlying each platform. Facebook might be similar to in-person neighborhood dynamics where personal social relationships and acquaintances would be intertwined, whereas Twitter might be akin to a broadcasting media system, in which issue attention would matter more than social relational maintenance so that networked users could be strangers to one another (for instance, a follower of a media network personality on a Twitter account would have no personal relationship with such a person even though the two were connected on Twitter).

Cluster. Lastly, students learned the concept of cluster, which referred to a subgroup within a network. Multiple subgroups could be identified in a single network. The clustering results would show a systematic pattern in the act of connecting, representing a prominent rule for group formations. The rule might be rooted in political orientation, geographical proximity, educational level, occupational type, religious background, and others. For example, in Blogosphere, politically liberal bloggers would tend to keep a blogroll of likeminded liberal blogs, whereas the conservative bloggers would exhibit the opposite list (Hindman, 2008). Looking at clustering in a social media network could help determine whether information was exchangeable across different clusters of people.

Centralities, density, and cluster were automatically computable by using network analysis software such as NodeXL. After learning about social network constituents (i.e., nodes and edges) and basic property measurements (i.e., centralities, density, and cluster), students practiced analyzing online social media data retrievable by using NodeXL. As of 2014, retrievable social media data from NodeXL were Facebook (Fan Page, Group, and Personal Network), Twitter (List, Search, Users Network), Flickr (Users and Tags Network), and YouTube (Users and Video Network). Data accessibility might vary contingent upon changes in each of the social media companies' privacy policies.

Two of the in-class assignments that students had engaged in were presented for the use of NodeXL in a classroom. Each assignment was a two-week project. The first assignment aimed to understand how to identify potentially important "opinion leaders" based on network positional properties. The majority of students in this particular course have shown interest in exploring their Facebook personal network structure as an example of online social network. Therefore, the following demonstration was based on the Facebook personal network analysis. The second assignment aimed to explore Twitter messages related to an important news issue, and understand the scope and impact of citizen journalism in the process of news propagation. Twitter was a proper venue for this course considering its improvised

news reporting system (Hermida, 2010) as well as its potential to harness community intelligence during a social crisis (Oh et al., 2013). Therefore, Twitter was a proper social media outlet for students to learn about the role of citizen reporting.

Facebook Personal Network Analysis

Once familiarized with the interface and the basic functions of NodeXL, students carried out the first assignment, which requested that they analyze their own personal network on Facebook (see Assignment 11.1). One prerequisite was that students must have an account on Facebook. The procedure was as follows: First, students logged into the Facebook system by using the plug-ins embedded in the NodeXL, which allowed them to import their own personal network data. Network data from Facebook included the list of friends, connections among, and personal attributes (such as gender, hometown, relationship status) of the friends when publicly available in Facebook. Second, students used the social network analysis function to compute the measures of basic properties. The results were saved as additional attributes alongside personal information. Third, students visualized their Facebook personal network by adjusting the network layouts, colors, size, and opacity. Visualization was customizable for the sake of the students' best interpretation of their network structures. Lastly, students reported in detail the structural characteristics of their Facebook personal network in terms of centralities, density, and clustering, and discussed who should be considered important actors (or opinion leaders) in the process of information spread within the network. Students often found it surprising that some social connections existed among individuals who were affiliated with discrete social groups, and that these crosscutting edges tended to result in high betweenness centralities. Based on the results of various degrees of centralities and sub-clusters, students could understand the interconnections among users and interpret which structural positions manifested the important roles in spreading the information.

Basically, this assignment intended to allow students to learn about their online personal network structure in one of the social media platforms (i.e., Facebook) and identify the locations of individuals who could be the potential opinion leaders based on the analysis of group clustering and node centralities. Considering that online news contents were largely carried over through personal social media networks, learning about the structure of media content flows on an interpersonal level could be an insightful, self-reflective project for journalism students.

Citizen Journalism Practices in Twitter During the Egyptian Revolution in 2011

For the second assignment, students carried out the analysis of Twitter data (see Assignment 11.2). NodeXL allowed students to use their Twitter account to search and download publicly available tweets (and retweets) as well as user networks based on retweeting or mentioning relationships. Students could collect the data by inputting search keywords of interest into the Twitter import bar embedded in the interface of NodeXL program. When inputting the search keywords, students set the maximum number of tweets to download (allowable up to 20,000 tweets). According to Twitter company policy, the Streaming API-based data collection had to be in "real time," which could span from the day of data collection up to the past two weeks. Twitter import function in NodeXL was programmed based on the Streaming API, adhering to Twitter data policy. Therefore, students were instructed to choose one of the most recent trending news topics and used the related search keywords for data collection. The downloaded dataset included tweets (and retweets) that contained the search keywords, the time of tweets sent, user IDs and profile descriptions, and the mentioning and/or retweeting relationships among users. For network analysis, users were defined as nodes, and mentioning and/or retweeting relationships were defined as edges.

After experimenting with Twitter data that the students had collected for their own interest, students performed the second assignment, which requested that they analyze the data provided by the instructor. This data was the collection of tweets during the first three days of the Egyptian Revolution, January 24–26, 2011. The Egyptian Revolution in 2011 demonstrated a successful role of citizen journalists who used social media, including Twitter, in disseminating of information and mobilization (Castells, 2013). It was an exemplary news topic for exploration. Whereas the real-time Twitter data collection in the NodeXL was versatile for recent news agendas, data from the Egyptian Revolution in 2011 was historical and not accessible by the real-time collection in NodeXL. Therefore, students were given the dataset previously collected by the instructor. Because NodeXL had not yet been released as of January 2011, the instructor had scripted Python (a computer language) to gain access to Twitter Streaming API. Although the instructor had used Python, the data collection process was almost identical to that of NodeXL considering that both Python and NodeXL were based on Streaming API. Specifically, the dataset was collected in real time and contained the same types of information such as tweets and retweets, time of tweets being sent, user IDs, user profile description, and retweeting relationships.

The three-day dataset of Egyptian Revolution 2011 included about 4,000 tweets: Among them, the majority was in English, and some were in Arabic. A small portion of tweets was in other languages. Only English and Arabic tweets, which

were translated into English by a bilingual graduate student, were further investigated. The data were stored chronologically in a real-time flow. Students worked in teams (two or three) to explore the nature of tweet messages, characteristics of the message senders, and geo-locations from which the tweets were generated. Upon completion of the review, students conducted a network analysis to determine the most central users in spreading the news to the Twitter public about the incident. Based on the exploration of data, students produced the following results.

Types of Communication. In terms of message types, the most prominent practice was to provide mass media coverage or official sources that affirm the importance and severity of the demonstrations, followed by the real-time situational updates, tactical knowledge, and expressive support for the protesters. Interpersonal use of Twitter was the least prominent despite the fact that the majority of tweets were sent out by personal users who were not affiliated with any mainstream media organization. Students explored user profiles and concluded that more than 70% of the identified tweet senders were personal users—citizen journalists. Only about 12% were media or governmental organizational representatives, and just a few tweets were from computer-bots. About 10% of the tweets were sent from unidentified users.

Out of the total tweets, 39% (n = 1,728) included URL, which hyperlinked a resource from the broader websphere. Among the hyperlinked resources, the majority were coming from user-generated content websites as much as from professional media websites, again confirming that the citizen journalists played a prominent role along with professional media sectors. While some were hyperlinked from non-movement or non-advocacy related organizations, there were not many re-sources directly distributed from the movement, advocacy, or campaign organizers.

Density. The retweet network analysis showed that the social network grew from 269 nodes with 405 edges to 900 nodes with 1,692 edges. Due to a relatively large size (hundreds of users participating in tweeting about the revolution), the density score tended to be very low, implying the sparseness of the network. Despite the sparseness, however, most of the actors were connected in some ways and together formed a big, single cluster. These results implied that Egyptian Revolution activists were organically networked through active information exchanges via retweeting practices.

Centrality. Students also identified the most central users by using centrality measures (i.e., degree centrality), concluding that prominent actors were personalized Twitter users who did not claim any association with advocacy/movement/media organizations. Only eight of the users among the top 25 out-degree centralities were identified as institutional Twitter users representing either media organizations or movement-related organizations. Also, the highest in-degree centralities were associated with citizen journalists or user-generated resources from social media sites

such as YouTube, Storify, TwitPic, Facebook, and yfrog. While reputational media websites such as BBC and Guardian and their representative Twitter accounts were also paid a non-trivial portion of attention, there were only six actors in the list that represent movement/advocacy/campaign organizations.

In sum, this assignment aimed to allow students to explore the real-world citizen journalistic practices occurring in social media platforms. By interpreting and analyzing tweet contents, user profiles and retweet networks, students could examine the role of ordinary online citizens in producing and spreading information during an important social, political event.

DISCUSSION

Ordinary citizens' influence on the process of content production, gatekeeping, and agenda setting has increased along with the popularity of social media services (Kwon et al., 2012; Neuman et al., 2014). The process of creating, editing, re-creating, and distributing user-generated contents has become so convenient and commonplace in this networked public environment that the subversive connotation that used to characterize citizen journalism a decade ago appeared somewhat out of fashion. Nevertheless, ordinary users' everyday information sharing practices in social media has contributed to result in a new genre of information production, so called affective news (Papacharissi & de Fatima Oliveira, 2012), which has combined facts with emotional reactions, and professional commentaries with laypeople opinions. Affective news has become an important resource for the online public to collectively understand an uncertain situation, often providing the impetus for political mobilization and crisis management.

In this chapter, citizen journalists were characterized as networked individuals who were embedded in online social network structures. Social network analysis was demonstrated in the course titled Social Media Networks as a way of training students on contemporary citizen journalism. Students learned that network structural properties shaped by various online networking activities such as friending, following, retweeting, sharing, liking, co-commenting, and so forth were as important as message contents in understanding, identifying, and interpreting the nature of citizen journalism. In particular, students utilized one of the user-friendly social media network analysis programs, NodeXL, for training. Among various social network analytic tools currently available to the academic community, NodeXL was selected due to (1) its availability at no cost, (2) its easy-to-learn interface on Excel template basis, and (3) its ability to allow users to retrieve some of the most popular social media data.

While the two assignments exemplified in this chapter were designed for a 400-level journalism undergraduate major course, they could also be adapted for

the graduate level. Basic concepts of social network analysis, including nodes, edges, centrality, density, and cluster, were introduced. Based on these concepts and measures, the goal of the first assignment was to analyze a personal Facebook network to understand the structural properties of potential opinion leaders in spreading news in an online network setting. The goal of the second assignment was to explore how ordinary users participated in the process of news streaming during a real-world news event. For the second assignment, students engaged in teamwork to analyze Twitter message contents, user characteristics, and the structure of retweet networks during the Egyptian Revolution in 2011.

As the course assignments exemplified learning social network perspectives and acquiring hands-on skill on network analysis software such as NodeXL could help journalism students explore not only the online users' everyday communication practices (such as the use of Facebook personal network) but also online news propagation during an extreme event (such as the use of Twitter hashtags and retweets). Students learned that the contemporary social media environment allowed online users to play a role in citizen journalism, either consciously or unwittingly, by engaging in retelling and redisseminating processes. Social media users could often play the role of audience gatekeepers, whose activities might collectively affect the salience of news agenda. Indeed, Neuman et al. (2014) highlighted that social media users' attention to news issues prominently affected the coverage of some issues, despite not all, in traditional media outlets. The "reverse patterns" of agenda setting (Neuman et al., 2014, p. 204) from social media users to mainstream journalism has become more prevalent. In this context, learning about the online network dynamics under which diverse types of information have been ceaselessly transmitted could help contribute to journalism students' understanding of the milieu in which information tools and social networks have been integrated.

REFERENCES

Barzilai-Nahon, K. (2008). Toward a theory of network gatekeeping: A framework for exploring information control. *The Journal of the American Society of Information Science and Technology, 59*(9), 1493–1512.

Bennett, W. L., & Segerberg, A. (2012). The logic of connective action: Digital media and the personalization of contentious politics. *Information, Communication & Society*, *15*(5), 739–768.

Bruns, A. (2005). *Gatewatching: Collaborative online news production.* New York, NY: Peter Lang.

Bruns, A., & Highfield T. (2012). Blogs, Twitter, and breaking news: The produsage of citizen journalism. In R. A. Lind (Ed.), *Produsing theory in a digital world: The intersection of audiences and production in contemporary theory* (pp. 15–32). New York, NY: Peter Lang.

Castells, M. (2013). *Networks of outrage and hope: Social movements in the Internet ag*e. Malden, MA: Polity Press.

Chang, W. Y. (2005). Online civic participation, and political empowerment: Online media and public opinion formation in Korea. *Media, Culture & Society, 27*, 925–935.

Dvorak, J. C. (2006). Citizen journalism is like citizen professional baseball: You can't play pro baseball just because you think the Seattle Mariners stink. *PC Magazine, 25*(18): 1.

Goode, L. (2009). Social news, citizen journalism, and democracy. *New Media and Society, 11*(8), 1287–1305.

Hansen, D., Shneiderman, B., & Smith, M. A. (2011). *Analyzing social media networks with NodeXL: Insights from a connected world*. Chicago, IL: Morgan Kaufmann.

Hermida, A. (2010). Twittering the news: The emergence of ambient journalism. *Journalism Practice, 4*(3), 297–308.

Hindman, M. (2008). *The myth of digital democracy*. Princeton, NJ: Princeton University Press.

Jarvis, J. (2008). In Munbai, wittnesses are writing the news. *The Guardian*. Retrieved from http://www.theguardian.com/media/2008/dec/01/mumbai-terror-digital-media

Kwon, K. H., Oh, O., Agrawal, M., & Rao, H. R. (2012). Audience gatekeeping in the Twitter service: An investigation of tweets about the 2009 Gaza conflict *AIS Transactions on Human-Computer Interaction, 4*(4), 212–229.

Lemann, N. (2006). Amateur hour: Journalism without journalists. *The New Yorker*. Retrieved from http://www.newyorker.com/archive/2006/08/07/060807fa_fact1

Meraz, S. (2011). Using time series analysis to measure intermedia agenda-setting influence in traditional media and political blog networks. *Journalism & Mass Communication Quarterly*, *88*(1), 176–194.

Neuman, R. W., Guggenheim, L., Jang, S. M., & Bae, S. Y. (2014). The dynamics of public attention: Agenda-setting theory meets big data. *Journal of Communication, 64*(2), 193–214.

NodeXL. (2014). Retrieved from http://nodexl.codeplex.com

Oh, O., Agrawal, M., & Rao, H. R. (2013). Community intelligence and social media services: A rumor theoretic analysis of tweets during social crises. *MIS Quarterly*, *37*(2), 407–426.

Papacharissi, Z., & de Fatima Oliveira, M. (2012). Affective news and networked publics: The rhythms of news storytelling on# Egypt. *Journal of Communication*, *62*(2), 266–282.

Pew Research Center's Internet & American Life Project. (2012, March 12). *Social networking sites and politics*. Retrieved from http://pewinternet.org/Reports/2012/Social-networking-and-politics.aspx

Rainie, L., & Wellman, B. (2012). *Networked: The new social operating system*. Cambridge, MA: MIT Press.

Shoemaker, P. J., Johnson, P. R., Seon, H., & Wang, X. (2011). Readers as gatekeepers of online news: Brazil, China, and the United States. *Brazilian Journalism Research, 6*(1), 55–77.

Shoemaker, P. J., & Vos, T. P. (2009). *Gatekeeping theory*. New York, NY: Routledge.

Sweetser, K. D., Golan, G. J., & Wanta, W. (2008). Intermedia agenda setting in television, advertising, and blogs during the 2004 election. *Mass Communication & Society*, *11*(2), 197–216.

Top 500 sites on the web. (2014). Retrieved from http://www.alexa.com/topsites

Wasserman, S., & Faust, K. (1994). *Social network analysis: Methods and applications*. New York, NY: Cambridge University Press.

Wellman, B., Quan-Haase, A., Boase, J., Chen, W., Hampton, K., Díaz, I., & Miyata, K. (2003). The social affordances of the Internet for networked individualism. *Journal of Computer-Mediated Communication, 8*(3). Retrieved from http://onlinelibrary.wiley.com/doi/10.1111/j.1083-6101.2003.tb00216.x/full

ASSIGNMENT 11.1. FACEBOOK PERSONAL NETWORK

Students were asked to analyze positional properties of individuals embedded in a Facebook personal network and identify who could be potentially important "opinion leaders" based on the network analysis results.

Specific instructions were as follows:

- Step 1. Download Facebook personal network by using "import" function embedded in the NodeXL interface. Nodes were the student's friends, and edges were friending relationships among the friends.
- Step 2. Compute analytic measures (centrality scores, density, and clustering) by using the network analytic functions embedded in NodeXL interface.
- Step 3. Compare and interpret the results by sorting the nodes list based on the ranks of each computed measurement property. Students could easily compare the network positional properties of each node. Some nodes were highly ranked according to one metric (e.g., betweenness centrality), while others were more highly ranked according to another metric (e.g., degree centrality). Students were asked to make a separate note about these results for their own record so that they could keep track of the results.
- Step 4. Visualize the network graph by adjusting the visual properties of nodes (i.e., size, color, opacity, and shape) and edges (i.e., width, color, and shape). If the network seemed to be too large or too cluttered, students were recommended to use the "dynamic filters function" embedded in NodeXL interface, by which less important nodes could be removed from the graph image.
- Step 5. Write a reflection paper that contains the network graph image (and the description about the process of visualization) as well as the network analysis results and the process of decision making in identifying opinion leaders. In particular, students were asked to describe (1) the structure of their Facebook network (e.g., size, density, number of clusters, social background or context of clustering), (2) network analytic rationales on which they concluded that some actors were the more important than others, and (3) the roles of these important individuals in spreading information by exemplifying a fictional situation wherein certain information needs to be disseminated.

ASSIGNMENT 11.2. INTERPRETING CITIZEN JOURNALISM PRACTICES IN TWITTER DURING THE EGYPTIAN REVOLUTION IN 2011

The second assignment aimed for students to demonstrate their understanding of the social network analytic concepts/measurements, and their capability to apply them to the real-world Twitter data. The assignment was composed of three parts:

(1) Network visualization (creating an effective graph image),
(2) An image caption, and
(3) Interpretation/discussion of Twitter data analysis results.

As a final assignment of the semester, this assignment asked students to creatively use the functions and tools embedded in Node XL and carefully study tweets and user profiles to interpret a Twitter network in the most meaningful way.

While the step-by-step instructions were identical to Step 2 to 5 of Assignment 11.1, the requirements for the reflection paper of the second assignment had some variations. Specifically, the reflection paper must (1) describe the network structure, (2) provide network analytic reasoning on identifying important actors, and (3) discuss the role of an ordinary citizen reporting in disseminating news about the Egyptian Revolution in 2011 by offering specific examples d awn from the analysis of the dataset.