

A Tweet by Any Other Frame: Three Approaches to Studying Educator Interactions on Twitter

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Abstract: Every day, thousands of educators use Twitter to interact with each other. Yet, the research that examines these educator interactions on Twitter is nascent, in part because it is unclear how to theoretically conceptualize the nature of interactions occurring in just 140 characters. In this paper, we explore three of the most promising theoretical frameworks for studying interactions on Twitter: *affinity spaces*, *media circuits*, and *social capital*. We examine what each perspective emphasizes and how these important features can be operationalized in Twitter interactions. We exemplify how these theories might be used by applying each to a descriptive analysis of the interactions that occurred in the #Edchat hashtag during a 24-hour period ($N = 7,509$ tweets). We found that each theory highlighted different characteristics of #Edchat and that each had its own strengths and weaknesses. We discuss the implications of this work for further understanding educator interactions on Twitter.

Keywords: Twitter, social networking site, social media, educator interaction, Edchat, affinity spaces, content interactions, social interactions, media circuits, social capital, bridging social capital, social ties, latent ties, weak ties, strong ties, community of practice, professional learning network

Introduction

Teachers and other educational professionals are using Twitter as a means of interacting and connecting with their colleagues and peers (Carpenter & Krutka, 2014). These interactions take place at a large scale: Over six months, Rosenberg, Greenhalgh, Koehler, Hamilton, and Akcaoglu (2016) captured 550,000 tweets—from 68,000 educators—using state educational hashtags (e.g., #miched, #wischat, #nyedchat, etc.). Research also shows that these educator interactions are largely teacher-driven, public, largely unmoderated, and thriving.

Research on how educators use hashtags to interact with one another is nascent, and researchers differ in how they conceive of teachers' use of Twitter and how they measure Twitter-based interactions. For example, different studies have described Twitter-based interactions in terms of communities of practice (Gao & Li, 2016), affinity spaces (Carpenter & Krutka, 2014; Rosenberg et al., 2016), or professional learning networks (PLNs; Visser, Evering, & Barrett, 2014). Each theoretical frame for approaching teachers' interaction on Twitter has different implications for how interaction is measured and interpreted.

In this paper, we explore the question of how to view teacher interactions in hashtag spaces by identifying and applying three theoretical frameworks that hold promise for studying educator interactions on Twitter: affinity spaces, media circuits, and social capital. We apply these frameworks to the hashtag #Edchat, one of the oldest and largest educator conversations on Twitter.

We used a "Twitter Archiving Google Sheet" (TAGS; Hawksey, 2014) and the Twitter application programming interface (API) to collect data during the 24-hour window of November 1, 2016 (Eastern Daylight Time). This data includes all tweets tagged with #Edchat that were not protected and had not been since removed ($N = 7,509$) as well as additional information about tweets, interactions, and involved Twitter users. In the following

sections, we examine these data through each theoretical framework, examining the key elements of interaction, how they map onto the features of Twitter, and how these features might be analyzed in practical research.

Affinity Spaces

Gee (2004) imagined *affinity spaces* to be defined primarily by a common goal, endeavor, or interest. The space is given content by a *generator* and accessed by one or more *portals*; the resulting space can be studied both in terms of *content interactions* and *social interactions* (how people interact with each other around the content).

The hashtag space in which we are interested is formed by the generator text “#Edchat.” In this study, we access the #Edchat affinity space through Twitter, but we note that Twitter is only one of many portals through which the space can be accessed (Gee, 2004; Lammers, Curwood, & Magnifico, 2012; Rosenberg et al., 2016). Additional portals would include other social networking sites associated with #Edchat (Facebook, Instagram, etc.), the #Edchat website/wiki (<http://edchat.pbworks.com/>), or the #Edchat podcast. The content of the Twitter affinity space occurs in the form of user-created *tweets* (short strings of text up to 140 characters in length). Content interactions on Twitter include *retweets* (when a user reposts or forwards content to others), *likes* (when a user marks a tweet, presumably to show approval), and tweets that contain a *hyperlink* (the address of a webpage), which, by connecting to another digital space and sharing external content, constitutes a form of information sharing (Gruzd, Wellman, & Takhteyev, 2011). Social interactions on Twitter include *addresses* (when a tweet begins with “@username” for the purpose of designating content intended to be read specifically by the specified user) and *mentions* (when a tweet includes “@username” in the middle of a tweet for the purpose of talking to a general audience about the user designated).

See Table 1 for a summary of these terms, definitions, and Twitter features for affinity spaces, as well three measures of content interaction and two measures of social interaction we found to be well-suited to an analysis of the #Edchat hashtag.

Theoretical Components	Twitter Features	Measures & Findings
<i>Generator</i> —Creates the content interactions and social interactions of the space	The #Edchat hashtag itself (accessed through a variety of digital platforms)	
<i>Portal</i> —Allows users to access the space	The #Edchat hashtag accessed on Twitter	
<i>Content interactions</i> —How users engage the content of the space	<i>Retweets</i> —Reposts of original tweets for others to see	47% of all tweets in #Edchat were retweets
	<i>Likes</i> —Marks on tweets that show approval	22% of all tweets (and 41% of original tweets) in #Edchat were liked
	<i>Hyperlinks</i> —Connections made to more information via sharing the address of a web page	75% of all tweets in #Edchat contained an hyperlink
<i>Social interactions</i> —How users engage with each other around the content of the space	<i>Addresses</i> —Tweets that are designated to be read by a specific user (talking to them)	6% of all tweets in #Edchat begin with @username
	<i>Mentions</i> —Tweets that refer to a specific user (talking about them)	38% of all tweets in #Edchat mention at least one @username (16% mention 2 or more)

Table 1: Theoretical components, Twitter features, and measures of the affinity space framework

This look at #Edchat through an affinity space framework shows high measures of content interaction as measured by retweets, likes, and hyperlinks. Social interactions show high levels when mentions are considered but lower levels when addresses are used as a measure. This may be due in part to the Twitter convention of dropping

hashtags from replies in order to respect character limits and move the conversation to a more personal space. Removing the hashtag, however, drops such replies from our tracker (and dataset).

Media Circuits

Interactions in the #Edchat hashtag space can also be understood through the theoretical framework of *media circuits*, which Rouse (1991) likened to electrical circuits, or closed paths through which networked connections flow. In a house, a simple electrical circuit has a *generator* (a power source), a *source path* (conductor from the power source to the application), a *load* (a fixture that consumes electricity, such as a light), and a *return path* (conductor to close the loop back to the power source). A simple media circuit, on the other hand, is where a creator creates and shares, then an interested audience views and comments back to the creator (Lange, 2008). Lindgren (2012) noted the mutuality inherent to such knowledge production and exchange.

Lange (2008) described a media circuit as a means by which members of a social group stay connected with other members; the circuit is not the social network itself but rather the process of both creating new social connections and supporting the interactions among existing connections within a social network. Media circuits can easily be spatially fragmented and scattered; one means through which they can be held together socially is through affinity spaces (Lindgren, 2012).

On Twitter, the media circuit begins with a *tweeter* (a Twitter user creating content) as generator, with each individual *tweet* (a single bit of microcontent, up to 140 characters in length) serving as a source path. The *audience* (all users reading a tweet) is the load, and the return path back to the original tweeter includes *retweets* and *likes*.

See Table 2 for a summary of these terms, definitions, and Twitter features for media circuits. The table also includes one measure of generator, one measure of source path, one measure of load, and two measures of return path we found to be well-suited to an analysis of the #Edchat hashtag.

Theoretical Components	Twitter Features	Measures & Findings
<i>Generator</i> —Provides a source of electric power	<i>Tweeter</i> —A user of Twitter who produces content	1,881 users contributed original tweets in #Edchat
<i>Source path</i> —Moves electrical current from source to load	<i>Tweet</i> —The content of Twitter, a short string of text up to 140 characters in length	47% of tweets in #Edchat were original tweets
<i>Load</i> —Consumes the electric power	<i>Audience</i> —Anyone who reads a tweet	Although Twitter measures <i>reach</i> , <i>exposure</i> , and <i>impressions</i> of tweets, these metrics are not currently available to researchers
<i>Return path</i> —Moves electrical current back to source, completing a closed path	<i>Retweets</i> —Reposts of original tweets for others to see <i>Likes</i> —Marks on tweets that show approval	47% of tweets in #Edchat were retweets 22% of all tweets (and 41% of original tweets) in #Edchat were liked

Table 2: Theoretical components, Twitter features, and measures of the media circuits framework

Considering #Edchat through a media circuits framework reveals complexity as measured by a large number of generators (tweeters) and high rates of tweets corresponding to both source and return paths. While there appears to be a dense maze of connections between tweeters and audience, our analysis is limited by the inaccessibility of the metrics for reach, exposure, and impressions of tweets. Missing this proprietary data means we can only speak to the paths of the media circuit, not to consumption by the load. Nonetheless, this is sufficient to conclude that #Edchat is a collection of media circuits that frequently close the loop between tweeter and audience.

Social Capital

A third way of thinking about interactions in the #Edchat hashtag space is through the theoretical framework of *social capital*. While affinity spaces and media circuits both have a significant emphasis on content, social capital ignores content and speaks to the strength of social connections between actors. The core idea of social capital theory is simply that social networks have value (Putnam, 2000) in the resources produced through relationships and the productive activity associated with those relationships (Coleman, 1988).

Important in social capital theory is the strength of connections, or *social ties*, between people (Donath, 2008; Ellison, Steinfield, & Lampe, 2007; Granovetter, 1973). Ties range from latent to strong, each with indicators that might be studied in Twitter conversations. *Latent social ties* are those social network connections made possible by the affordances of the technology but not yet activated (Haythornthwaite, 2005). *Weak social ties* are those social network connections that are limited to a specific context and characterized by a diversity of ideas and values; *strong social ties* are those social network connections that span contexts, represent shared interests, and foster intimacy and emotional support (Granovetter, 1973; Donath, 2008).

On Twitter, key to social ties is the mechanism of *following*, where users can link to other users and see their tweets without requiring reciprocation (boyd, Golder, & Lotan, 2010). A latent tie occurs wherever two users are not following each other; they could be linked together through the affordances of Twitter, but they are not. A weak tie occurs in the case of a *unilateral* link, where one Twitter user follows the other but this is not reciprocated. A potentially stronger kind of weak tie is a *mutual*, where two users follow each other (Gruzd et al., 2011). A true strong tie between two users is difficult to determine on Twitter without careful discourse analysis of how those users are interacting, which is beyond the scope of this study.

Built upon the idea of social ties is the distinction between bridging and bonding social capital. *Bridging social capital* is related to weak ties and includes the value derived from diverse networks, information diffusion, and connections to external assets; *bonding social capital* is related to strong ties and is the value derived from reaffirming identity, mobilizing solidarity, and encouraging reciprocity (Putnam, 2000). Bridging social capital is associated with activating latent ties to become weak ties (Haythornthwaite, 2005) and expanding a network of weak ties (Putnam, 2000). Bonding social capital is associated with strengthening ties, whether they be weak ties becoming strong, or strong ties being preserved and reinforced (Putnam, 2000).

On Twitter, bridging social capital is observed when a user *retweets* or *likes* content that is from a stranger or a unilateral, or when a user *addresses* or *mentions* another user who is a stranger or a unilateral; each of these interactions provides a new connection from a previously latent tie or a strengthening of a previously weak tie (Williams, 2006). Bonding social capital is observed whenever mutuals *address* (@username) one another or communicate in private *direct messages* (DMs) for the purpose of problem-solving, advice-giving around important decisions, or emotional support (Williams, 2006). As in the case of strong social ties, these behaviors are more difficult to discern, and therefore discourse analysis techniques must be employed.

See Table 3 for a summary of these terms, definitions, and Twitter features for social capital, as well as three measures of bridging social capital and three measures of bonding social capital we found to be well-suited to an analysis of the #Edchat hashtag.

Theoretical Components	Twitter Features	Measures & Findings
<i>Latent social ties</i> —A user's connections that are possible but not yet activated	<i>Strangers</i> —Two Twitter users who are not following each other	
<i>Weak social ties</i> —A user's connections that are limited to a specific context and are characterized by a diversity of ideas and values	<i>Unilaterals</i> —One Twitter user follows another but this is not reciprocated <i>Mutuals</i> —Two Twitter users follow each other; a subset of mutuals are weak ties, as determined through discourse analysis	
<i>Strong social ties</i> —A user's connections that span contexts and are characterized by intimacy and emotional support	<i>Mutuals</i> —A subset of mutuals are strong ties, as determined through discourse analysis	

<p><i>Bridging social capital</i>—Value derived from latent ties becoming weak ties or expanding the network of weak ties</p>	<p>Interactions between strangers/unilaterals (not mutuals):</p> <p><i>Mentions</i>—Tweets that refer to a specific user (talking about them)</p> <p><i>Retweets</i>—Reposts of original tweets for others to see</p> <p><i>Likes</i>—Marks on tweets that show approval</p>	<p>Interacting with the original tweets in #Edchat:</p> <p>64% of mentions were between strangers/unilaterals</p> <p>62% of retweets were between strangers/unilaterals</p> <p>59% of likes were between strangers/unilaterals</p>
<p><i>Bonding social capital</i>—Value derived from weak ties becoming strong ties, or strong ties being preserved and reinforced</p>	<p>Interactions between mutuals (a subset, as determined by discourse analysis):</p> <p><i>Mentions</i></p> <p><i>Retweets</i></p> <p><i>Likes</i></p> <p>A subset of <i>direct messages</i>, as determined by discourse analysis</p>	<p>Interacting with the original tweets in #Edchat:</p> <p>36% of mentions were between mutuals</p> <p>38% of retweets were between mutuals</p> <p>41% of likes were between mutuals</p> <p>These metrics are not currently available to researchers.</p>

Table 3: Theoretical components, Twitter features, and measures of the social capital framework

Viewing #Edchat through a social capital framework shows high measures of bridging social capital as measured by mentions, retweets, and likes of original tweets, as these interactions occurred much more often between strangers or unilaterals than between mutuals. With our current approach, we are unable to fully measure bonding social capital; we are only able to show the general domain in which it might develop. Bonding social capital is possible between mutuals but would be evidenced only by a subset of interactions between mutuals, and our current approach does not allow for discourse analysis. Still, our findings show that #Edchat appears to be more associated with bridging capital anyway. Measurement of bonding social capital is also limited by the private nature of Twitter direct messages, inaccessible to researchers.

Discussion

Each of the three theoretical frameworks points to different elements of the #Edchat conversation, with strengths and weaknesses to each approach. Even while examining much of the same data, these frameworks emphasize different aspects of educator interactions and draw out different meanings. Looking at three frameworks simultaneously exposes the limited scope of any one theory and expands the insight gleaned from three different vantage points.

We were able to apply each of the three theoretical frameworks to Twitter #Edchat, but this application was more difficult for some frameworks than others. Applying affinity spaces to #Edchat was relatively straightforward, as its measures were easily quantified from Twitter data. Applying media circuits was not hard to conceptualize, but it was more difficult to measure since the data associated with load is not available to researchers. However, since the emphasis for media circuits is on the paths and whether or not loops get closed, leaving load as a question mark was not a significant problem. Finally, applying the social capital framework to #Edchat was a challenge. This framework is broad enough that its key concepts (and resulting metrics) are not readily apparent. Even after following the lead of Williams (2006), it took considerable effort to identify appropriate measures. Ultimately, we

were successful in measuring bridging social capital, but measuring bonding social capital will mean employing research methods far beyond the scope of this present study.

Affinity spaces focus attention on the content of a space (i.e., why the space exists) and then consider what is happening there. For example, this framework allows us to determine whether people are coming to interact primarily with the content itself or with the other participants (the social aspects). Our approach gave good insight into how educators were interacting around the content of the space, but revealed less about how educators may have been interacting purely with each other, due to the aforementioned problem of Twitter conversations dropping hashtags and thus falling out of the #Edchat space. An affinity spaces framework could speak to this, but would require additional modes of inquiry.

Media circuits focus more attention on the social aspects of #Edchat while still placing importance on content; the main question is whether or not interactions are connecting users back to the creator of the content. Our approach showed that the educator interactions were indeed about social connection and readers linking back to tweeters, but did not give insight as to why educators might have been tweeting or why readers might have been engaging with those tweets.

Finally, social capital focuses all attention on the social aspects of #Edchat and completely deemphasizes content; for social capital, the only consideration is a social one: the question of what value and resources are being created or protected in each interaction. Our approach did not speak to content at all, but revealed the social utility and benefit of educators participating in the space.

With all of these factors considered together, this study has some helpful insights for teachers considering their professional development. Our study of the three theoretical frameworks of affinity spaces, media circuits, and social capital shows #Edchat to be useful for educators to find new content, social connections, and expanded networks. A quick glance at #Edchat on Twitter would result in a list of many tweets, presumably content around education and learning. This in itself would be valuable to educators. However, we also found evidence to suggest that #Edchat is an affinity space where educators are gathering to interact around that content, but also—to a lesser extent—with each other. The rates of retweets, liked tweets, tweets containing hyperlinks, and mentions suggest that #Edchat is indeed a place to engage with other educators around the shared endeavor of teaching. We found evidence to suggest that #Edchat is a hub of numerous media circuits, where educators are not just promoting their ideas and opinions but are specifically linking back to other educators in the form of retweets and liked tweets. Finally, we found evidence to suggest that #Edchat develops social capital, especially bridging social capital. The rates of mentions, retweets, and liked tweets between Twitter users who do not mutually follow each other suggest that this is a place to expand social connections and encounter new ideas.

Limitations and Future Work

In this paper, we have examined only a subset of the theoretical frameworks that could be brought to bear when studying teachers' interactions using Twitter, and future research could expand this work by examining some of the frameworks that we have not addressed or by examining these frameworks in greater detail. For example, as previously noted, some research on teachers' use of Twitter has used the metaphors of the community of practice (e.g., Gao & Li, 2016) or the PLN (e.g., Visser et al., 2014). However, other theoretical frameworks are also available. For example, Herring (1999) described *interactional coherence* as the degree to which communication is cognitively manageable and is measured by the presence (or lack) of characteristics such as turn-taking, disrupted turn adjacency, and sequential coherence. Other possible frameworks include *uses and gratifications* theory (Liu, Cheung, & Lee, 2016), *regulative vs. instructive* discourses (Lammers, 2013), and *affinity vs. disruption* discourses (Lindgren, 2012).

Furthermore, we have noted that our exploration of the theoretical framework of social capital was limited by the methods that we have employed; further exploration of this approach using mixed-methods research would further illustrate the implications of this framework for scholarly inquiry of educator interactions.

Conclusion

Educators are using Twitter extensively and creatively for their professional development, but research into how they are actually interacting with each other is just beginning to emerge. In this exploratory study, we have taken tweets from a single day in one of the largest and oldest conversations about education and learning on

Twitter, #Edchat. We applied three theoretical frameworks to #Edchat and found that it is indeed a place for educators to find new content, social connections, and expanded networks. This study has laid a foundation for numerous avenues of future inquiry.

References

- boyd, d., Golder, S., & Lotan, G. (2010). Tweet, tweet, retweet: Conversational aspects of retweeting on Twitter. *Proceedings of the Annual Hawaii International Conference on System Sciences*. <http://doi.org/10.1109/HICSS.2010.412>
- Carpenter, J. P., & Krutka, D. G. (2014). How and why educators use Twitter: A survey of the field. *Journal of research on technology in education*, 46(4), 414-434.
- Coleman, J. S. (1988). Social capital in the creation of human capital. *American journal of sociology*, S95-S120.
- Donath, J. (2008). Signals in social supernets. *Journal of Computer-Mediated Communication*, 13, 231-251.
- Ellison, N. B., Steinfield, C., & Lampe, C. (2007). The benefits of Facebook “friends:” Social capital and college students’ use of online social network sites. *Journal of Computer-Mediated Communication*, 12(4), 1143–1168. doi:10.1111/j.1083-6101.2007.00367.x
- Gao, F., & Li, L. (2016). Examining a one-hour synchronous chat in a microblogging-based professional development community. *British Journal of Educational Technology*. doi:10.1111/bjet.12384
- Granovetter, M. S. (1973). The strength of weak ties. *American Journal of Sociology*, 78(6), 1360-1380. doi:10.1086/225469
- Gruzd, A., Wellman, B., & Takhteyev, Y. (2011). Imagining Twitter as an imagined community. *American Behavioral Scientist*, 55(10), 1294-1318.
- Hawksey, M. (2014). TAGS: Twitter archiving Google sheet (version 6.1) [software]. Available from <http://tags.hawksey.info>
- Haythornthwaite, C. (2005). Social networks and Internet connectivity effects. *Information, Communication, & Society*, 8(2), 125–147.
- Herring, S. C. (1999). Interactional coherence in CMC. *Journal of Computer-Mediated Communication*, 4(4). doi:10.1111/j.1083-6101.1999.tb00106.x
- Lammers, J. C. (2013). Fangirls as teachers: Examining pedagogic discourse in an online fan site. *Learning, Media and Technology*, 38(4), 368–386. <http://doi.org/10.1080/17439884.2013.764895>
- Lammers, J. C., Curwood, J. S., & Magnifico, A. M. (2012). Toward an affinity space methodology: Considerations for literacy research. *English Teaching*, 11(2), 44–58.
- Lange, P. G. (2008). Publicly private and privately public: Social networking on YouTube. *Journal of Computer-Mediated Communication*, 13(1), 361–380. <http://doi.org/10.1111/j.1083-6101.2007.00400.x>
- Lindgren, S. (2012). “It took me about half an hour, but I did it!” Media circuits and affinity spaces around how-to videos on YouTube. *European Journal of Communication*, 27, 152–170. <http://doi.org/10.1177/0267323112443461>
- Liu, I., Cheung, C., & Lee, M. (2016). User satisfaction with microblogging: Information dissemination versus social networking. *Journal Of The Association For Information Science And Technology*, 67(1), 56-70. <http://dx.doi.org/10.1002/asi.23371>
- Putnam, R. D. (2000). *Bowling alone: The collapse and revival of American community*. New York: Simon & Schuster.
- Rosenberg, J. M., Greenhalgh, S. P., Koehler, M. J., Hamilton, E. R., & Akcaoglu, M. (2016). An investigation of State Educational Twitter Hashtags (SETHs) as affinity spaces. *E-Learning and Digital Media*, 13(1-2), 24-44. <http://doi.org/10.1177/2042753016672351>
- Rouse, R. (1991). Mexican migration and the social space of postmodernism. *Diaspora: A journal of transnational studies*, 1(1), 8-23.

Visser, R. D., Evering, L. C., & Barrett, D. E. (2014). #TwitterforTeachers: The implications of Twitter as a self-directed professional development tool for K–12 teachers. *Journal of Research on Technology in Education, 46*, 396–413. doi:10.1080/15391523.2014.925694

Williams, D. C. (2006). On and off the 'net: Scales for social capital in an online era. *Journal of Computer-Mediated Communication, 11*(2), 593–628. <http://doi.org/10.1111/j.1083-6101.2006.00029.x>