

twitter.com Hidden Network Case Study

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Abstract

Offering only 140 characters to communicate a thought, the twitter.com microblogging platform is one of the most popular social networking websites. This qualitative case study explores participant experiences within a sub-network of twitter users. From a multiple source analysis, this study finds that the sub-network participants formed reciprocal following relationships based on a shared interest in education and technology and participate in complex interactions within an always on stream of communication. While access to people, information, and resources motivates users to follow the communication, participation is also driven by a desire for membership within a learning or professional development network. As such, transparency and reciprocal contributions are forms of network currency offered to others to gain network membership.

Hidden Social Networks on twitter.com

Individuals and organizations are increasingly logging on to the twitter.com microblogging platform to both broadcast messages and engage in reciprocal dialogue. As of December 1, 2009, the twitter.com website had the 14th highest traffic rank on the Internet based on combined visitors and page views (“twitter.com - Traffic Details from Alexa,” 2009). Yet, it was only in the past year that the website surged onto the list of top 100 websites. While the premise of the twitter.com website is simple, the resulting communication among users and the network interactions are rather complex. Registered users broadcast on the open Internet the text-based answer to the simple question “What’s happening?” and are given only 140 characters to provide an answer. Yet, through enhanced features, such as direct messages, @ replies, re-tweets, and hyperlinks to other media and websites, users engage in complex communication. When users follow and are followed by others, hidden social networks within the larger twitter.com social network are formed through the reciprocal following relationships that connect participants (Huberman, Romero, & Wu, 2009). However, the experiences of participants within these sub-networks on twitter.com have not been widely studied. The purpose of this qualitative case study is to explore participant experiences within a hidden social network of over 3,100 twitter.com users with a reciprocal following relationship with user *edtechtalk*.

Literature Review

Social Network Theory and Research

Long before the advent of twitter.com, a large body of social network theory and research was conducted centering on three primary threads of network research, including (a) the nature of the network relationships, (b) the governance of the network relationships, and (c) network structure (Hoang & Antoncic, 2003). Many social network studies use and apply the network tie

hypothesis forwarded by Granovetter (1973) which focuses on social network structure, the strength of interpersonal network ties, and the resulting impact on macro level social issues (Jack, 2005). The network tie hypothesis proposes that social networks are comprised of clusters of strong tie relationships bridged by weak tie acquaintances. Theory and research suggests that while clusters of strong tie connections cultivate collective action, weak tie social connections foster knowledge diffusion and innovation (Obstfeld, 2005).

Internet-based Social Theory and Research

The theoretical foundations to examine Internet-based social experiences come from a range of fields, including anthropology, sociology, psychology, linguistics, and communication, with many studies applying social network theory (Li, Zeng, Mao, & Wang, 2008). As discussed below, research on Internet-based social networks, such as facebook.com and blogging or microblogging websites, suggests computer-mediated platforms support both strong and weak tie relationships, yet unique communication and interaction patterns exist across platforms.

While facebook.com users are *able* to build associations with millions of other platform members, research suggests that most only communicate with a small proportion of their existing close relationships. Through a massive data collection of 284 million message sent by 4.2 million facebook.com members within 496 North American colleges and universities, Golder, Wilkinson, and Huberman (2007) found the communication among the college students to be tightly clustered by school. While over 90% of messages were exchanged between those with declared friendship relationships, only 15% of friend pairs exchanged messages. These findings suggest two types of friendship networks on facebook.com with distinct communication and interaction patters; a larger network of declared acquaintances with little direct communication and a smaller network of close relationships where most communication occurs.

However, Nardi, Schiano, and Gumbrecht (2004) found an entirely different interaction and communication pattern within an ethnographic study of bloggers. Instead of engaging in two-way dialogue with strong tie relationships, the bloggers broadcast messages to a network of both strong and weak tie acquaintances; those described by bloggers as either friends, family, or readers. Unlike the communication on facebook.com, the bloggers talked *at* versus *with* their audience in order to (a) update others on events, (b) express opinions in order to influence others, (c) seek specific feedback, (d) foster their personal writing process, and (e) release emotions. The bloggers expressed appreciation for the limited one-way interaction and felt permitted to be less responsive to others than they would be in person or in an e-mail exchange. One blogger went so far as to describe readers' comments as *rhetorically subservient* to the main blog post.

Early research on microblogging suggests communication and interaction patterns that fall between that of bloggers and facebook.com users. Using the twitter.com developer application programming interface (API), Java, Song, Finin, and Tseng (2007) captured over 1.3 million tweets made by over 76,000 unique users on the twitter.com public timeline during a two month period in 2007. The researchers also retrieved the friendship relationships (*following* and *followed by* data) for each user which suggested a high degree of friendship reciprocity (0.58) among the twitter.com users. The researchers found that twitter.com users often form new relationships by browsing the friends of friends and from searching profiles for those with common interests. Unlike what was observed in the noted facebook.com research, less than 13% of the tweets (made by only 21% of users) were directed to another twitter.com user (as captured by the use of the @ symbol preceding the other user's name), suggesting that most tweets are intended as public broadcast messages. As such, research suggests that this pattern of relationship formation results in two types of network relationships that are similar to those

found on facebook.com; a larger social network with many declared friends (or followers) and a smaller one in which posts are frequently directed (Huberman et al., 2009). However, these findings also suggests that while twitter.com users tend to form reciprocal following relationships with many others on the platform, the users' communication patterns are like bloggers who broadcast messages rather than engage in direct one-to-one conversations.

Microblogging in Education

Researchers and instructors have explored possible uses of twitter.com within educational settings to facilitate both strong tie connections within a class, as well as weak tie associations outside the group. Costa, Beham, Reinhardt, and Sillaots (2008) utilized microblogging as a formalized backchannel to facilitate communication for learners within a course. The researchers suggest that microblogging effectively facilitated unplanned information sharing and discussion among the students, but some students found the loosely linked communication to be chaotic, overwhelming, and distracting. In a similar study of microblogging in a course, Ebner and Maurer (2008) found that many students perceived microblogging as a good means to facilitate announcements, share links, and expand conversations beyond the class session, but some students found the open format too public.

Others have also explored using microblogging to foster new networked relationships outside the classroom around shared interests. Ebner and Schiefner (2008) created a microblogging channel and invited German educational bloggers (edubloggers) to subscribe. The researchers concluded that a loosely joined network formed over the months of the study which fostered information and experience sharing over what one participant described as a *virtual coffee machine*. During a course in the fall of 2008, Dunlap and Lowenthal (2009) incorporated twitter.com into the course in the hopes of linking students to a broader network of practicing

professionals. While informal course member communication was facilitated, the instructors found that students also benefited from the interactions with a global network of education professionals who offered real-world perspectives on course content.

Research Questions

While prior research provides insight into social network structure, some argue there is a gap in the literature regarding the nature of network interactions (Jack, 2005). Others suggest the need for a closer examination of the communication and information sharing within the hidden networks, or *small worlds*, that form within microblogging networks (Java et al., 2007). Still others call for further study of microblogging communication and interaction to consider the potential use and value of microblogging technologies in learning and professional development settings (Dunlap & Lowenthal, 2009; Costa et al., 2008). While a vast body of social network theory and research exists, the literature review suggests there is much more to learn about the experiences of participants in a twitter.com sub-network. What is the nature of the communication and interaction occurring within the sub-network? Why do users participate? How do users represent themselves, including the demographic information they chose to share within their profiles?

Methodology

Method of Inquiry

A qualitative case study was conducted to address the research questions by exploring participant experiences within a hidden (or small world) sub-network formed out of reciprocal following relationships within the larger twitter.com social network. A case study approach allowed an in-depth investigation of the research questions within the actual context and supported a multiple source examination of the emerging twitter sub-network phenomenon (Yin,

2009). The specific case being examined is bounded by the sub-network of reciprocal following relationships that exist between user *edtechtalk* and approximately 3,100 other twitter.com users who share a mutual interest in education and technology. Over a four week period beginning October 10, 2009, data about the sub-network were collected, including (a) observations of user communication and interaction, (b) document reviews of user profile data, and (c) online asynchronous interviews with established members of the sub-network.

Data Collection

Observations. The primary sample for this study is those twitter.com users within the *edtechtalk* sub-network who posted a tweet on the public timeline during ten observation periods during the month of October 2009. As outlined in Table A1 in Appendix A, the observations were conducted during 30 minute periods over the course of 10 consecutive days. Any tweet made by any person *edtechtalk* follows was observed by reading the text-based activity on the twitter.com public timeline. As shown in Table A2 in Appendix A, the content of each 140 tweet was recorded on an observation checklist and categorized based on whether the tweet was (a) a re-tweet (RT@), (b) directed to a specific person (@username), (c) tagged by the author (by use of # symbol), (d) included a hyperlink to a website, (e) about education or educational technology, and (f) made on twitter.com or another platform.

Documents review. During the observation period, 499 unique twitter.com users posted. To develop a sample for the document analysis, 50 users from the group of 499 were randomly selected to create sample for the document analysis equal to 10% of the primary study sample. As shown Appendix B, public profile data were collected for each of the 50 randomly selected users, including the user's (a) twitter user name, (b) real name, (c) location, (d) biography, (e) number following, (f) number of followers, (g) number of tweets, (h) picture (default, self, or

other), and (i) date the user joined twitter.

Interviews. A small sample from the 499 who tweeted during the observation period was purposefully selected and contacted via twitter.com direct messaging to participate in an online asynchronous interview. Based on a review of user profile information and posting history, a total of 17 users were selected who (a) are followed by and follow user *edtechtalk* (b) are employed in the education field, (c) were early registrants on the twitter.com platform, and (d) continue to frequently post on topics of education and technology within the network. From the 17 users who were contacted, five completed the online interview conducted October 30, 2009 through November 7, 2009 which focused on how participants perceive their participation and experience on twitter.com, as well their perceptions about the interaction and communication with those they follow and those who follow them. The interview questions, informed consent, and correspondence with participants are outlined in Appendix C.

Data Analysis

Observation analysis. Collected data from the observation periods were analyzed for each of the 10 observation periods to consider topics and themes that arose during the specific session. Transcripts were then aggregated into a single table and each tweet made during the observation period was coded based on when and how the tweet was made (within the twitter.com website or another twitter client), whether the tweet included the “RT@”, “@”, or “#” symbols, and whether the tweet included a hyperlink to another website. In addition, the content of each tweet was analyzed to consider the nature of the tweet and how (if) the tweet was related to educational technology. Also, a visualization of the 150 most frequently used words in the entire collection of tweets was created using wordle.net, as shown in Appendix D.

Document analysis. Collected data from the 50 user profiles were aggregated into a

table. Location data were analyzed to consider the geographic locations of participants. External website data were analyzed to examine the extent to which users have other web presence apart from twitter. The date the user joined twitter was analyzed to consider the tenure of the users. The provided bios were analyzed to consider how the users presented and represented their backgrounds. Also, a visualization of the 150 most frequently used words in the profile biographies was created using wordle.net, as shown in Appendix E.

Interview analysis. The collected interview responses for each participant were first analyzed individually to consider each respondent separately. The individual responses were then aggregated under each question to allow an analysis of responses by question.

Condensed data analysis. The collected data was then combined into a condensed case record from the multiple sources which allowed a comparison of the information obtained at different points in time and by different means which contributes to the overall credibility of findings (Patton, 2002). The analysis focused on building an explanation about the sub-network related to the key issues and themes raised by the research questions (Yin, 2009), including (a) the nature of the communication, (b) the nature of the interaction, and (c) motivations for participation. The following highlights the themes that emerged from the analysis.

Findings

Nature of the Communication

Always on / always accessible. Based upon the observed communication and responses from interview participants, twitter users interact in an *always on* and *always accessible* stream of communication. Notably, during the observation period only one in five tweets was posted directly from the twitter.com website. Most tweets were posted from within over 75 different browser, phone, or desktop applications suggesting that users take advantage of the broad range

of options to access the stream of communication. While some interview participants described the stream of communication as “transient” and “fractured”, others noted that twitter communication is “live”, “constant”, and an “office buddy” that affords the ability to “glance at” or “graze” topical and timely information anytime and anywhere. One interview participant equated twitter communication to a cocktail party with many conversation occurring all around the room with many different people talking at once that “you just sort of jump into the middle of one [conversation] and participate ... This is the real-time web and it's just like nothing else we've ever had.” Another interview participant described the twitter stream of communication as uniquely *ambi-synchronous* (ambient and synchronous), noting that, “[Twitter] possesses the immediacy and capabilities of synchronous messaging in which there's greater immediacy of interpersonal communication, but it also creates a persistent, asynchronously available record of communication that allows you to catch up on what you missed while offline ... What other tools enable both types of communication?”

Broadcast messages and conversations. Within this stream of communication are a mix of broadcast messages and publicly viewable one-to-one conversations. During the observation period, approximate one in three tweets included the @ symbol which signals that a tweet is directed to (or in reply to) a particular user. Roughly half of the observed @ tweets were *re-tweets* as indicated by the “RT@” symbol which signals the information was previously tweeted by someone else. However, the @ tweets targeted to an individual user are not private conversations as the content is publicly viewable and are sometimes *re-tweeted* by others. Yet, the majority of tweets are simply a one-way broadcast with no specified user target.

Shared interest communication. All of the interview participants described the shared interest communication on twitter which for this sub-network focuses on education and

technology topics. Further, the vast majority of observed tweets were related to education or technology. As seen in Appendix D, the most frequently used words within the 1,093 observed tweets included teacher (teachers), learning, education, and technology related words such as blog, Google, twitter, web, video, and iPhone. During the observation period, approximately one in five tweets included a hash tag symbol (#) which associates the content of the tweet to a particular topic and makes the tweet easier for others to find during a twitter topic search. Examples of tagged content during the observation were tweets associated with face-to-face education conferences (#EdenPort09 or #CIT09), types of tools (#graphs), twitter specific events (#lrnchat or #followfriday), current events (#googlewave, #balloonboy), or the general topic of educational technology (#edtech). In addition, all of the 50 reviewed user profiles included biographies that described the user's specific tie to education. As seen in Appendix E, frequently used words within the bios included education and educational technology related descriptors, such as teacher, technology (tech), educator, ICT, learning, e-learning, and geek.

Nature of the Interaction

Network ties. From the interview responses, the observation of communication, and the profile reviews, the nature of sub-network relationships emerged. The demographic data from the profile information indicate that most participants are *not* linked by geographic or workplace connections. Instead, the sub-network following relationships are created and fostered through the participants' shared interest in education and technology forming a vast network of weak tie relationships. Several of the interview participants attempted to describe the nature of the twitter relationships (or friendships). One offered a detailed description of how he perceives the *levels* of twitter relationships.

“There's enough of a sense of community that my wife and I have discussed at length whether someone on Twitter can legitimately be called a "friend" when

you've never met them in person or know them beyond what they tweet ... I've arbitrarily created several personal definitions to distinguish the degree of relationship ... Someone who I've followed for a while and who, for me, possesses a salient individual persona -- I know and remember their username and/or real name and, often (if they don't change it), their avatar -- is, generically, a colleague or Twitter colleague ... A Twitter colleague, for me, becomes more of a friend when I've met them face to face and spent some time."

As is suggested from this interview excerpt, the nature of the interactions among twitter relationships are not static nor confined to the twitter platform. Another interview participant stated, "[I am] struck by the friendships I've developed as a direct result of my use of Twitter" and noted the *tweetups* (or face-to-face meetings) that have resulted from his online twitter interactions. These described user experiences suggests that the weak tie relationships formed on the platform often foster stronger ties that are sustained both on and off twitter.

Transparency. Transparency is central to twitter sub-network interactions, including forming and maintaining sub-network relationships. When asked to describe how participants decide which users to follow on twitter, those interviewed were unanimous in stating that they do not *automatically* follow anyone who follows them, but rather adhere to a personal screening process based on a review of the other user's public profile. Participants noted that they review the background information of others to consider "Who are they?", "What are they about?", and "Are they spammers?" Several described how they have become more discriminating over time and only follow those who are most closely aligned to their own interests and backgrounds. One noted, "I am more careful to read the bios of an individual ... I no longer automatically follow all educators" while another stated, "I also look at who my peers are following."

The transparency and self-disclosure required for such a screening process within the network may suggest why users are so willing to post specific details about their personal and profession lives within their profiles and tweets. Based on the collected data, users do not hide

behind false personas or pseudonyms. Most users provided real names either in their profiles, as part of their user names, or within their linked blogs or websites. While one interview participant noted that to those unfamiliar with twitter the level of self-disclosure can seem “creepy”, many observed tweets were status updates about personal and professional activities which specified the user’s location, details about the activities or events the user was attending (sometimes with kids or other family members), and specific information about work or personal projects. Of the 50 reviewed profiles, each included some reference or link the user’s geographic location (a few with specific location coordinates from GPS enabled devices), as well as specific information about the nature of the user’s professional interest in education and technology, academic background, occupation, and aspirations.

Audience awareness. Awareness of an audience is central to twitter sub-network interactions. While all interview participants stated that they are not concerned that their tweets are publicly viewable, all are *aware* of having a public audience. From interview responses, users pay attention to their *followed by* and *following* lists, the nature of their postings, and whether the content they post is relevant and suitable for the audience. One commented that the Internet uses “indelible ink” while another shared that he follows “one simple rule ... be nice.” During the observation period, no rants, fights, or uses of profanity were observed (beyond a rare “damn”) suggesting that audience awareness influences what is posted. While users frequently discussed work and personal contacts, no tweet harshly targeted a specific colleague, workplace, or school. Negative comments were at worst general commentary about the field of education (“educators = creatures of habit?”), the day-to-day chores of the job (“grading papers, etc. woof.”), or a difficult day (“Worst. Day. Ever. If I had a hamster it would probably die today. In fact no, it would probably get caught on fire and then die”).

Motivations to Participate

Access. Access to people, information, and resources appears to be a primary motivator to participate. One interview participant described twitter as “a VERY large community of practice scattered around the globe as if we all worked in the same building.” Another interview participant suggested that he has learned more from his participation on twitter than he had from any formal education program. Half of the observed tweets included a hyperlink to another website and many tweets were requests to the network for help, such as “Anyone using simpleassessment.com from infosource as tech literacy measure?”, “Is there a live blogging site for #spc09? Can someone share?”, or “Please give me a shout if you said you were willing to help with an article about SLF TeachMeet for Teach Primary mag - can't recall who.”

Reciprocity. Participation also appears to be fueled and sustained by what is described in network literature as *general reciprocity obligations* in which an assumed condition of membership to the network is the sharing of knowledge (Centre for Educational Research and Innovation, 2004). As such, the cost to participate is participation and the contributions by users are a form of network currency. As one interview participant noted, “I get (and like to think I add) value from my participation.” While many observed tweets were merely updates of daily routines, most involved information relevant to the education and technology community, including recommendations of books, online resources, or websites. Interview participants appear aware they are making relevant tweets as contributions toward network membership based on their suggested reasons of why others read their tweets, including “I’m interesting and generous with my knowledge”, “I add value to their stream of learning”, “I deliberately try to tweet useful, educationally relevant content and ideas”, and “I’ve become sort of a thought leader in the industry, so ... I try to tweet valuable information and be as entertaining as I can.”

Discussion

As seen in prior research involving twitter, hidden networks (or small worlds) within the larger social network form when users have the ability to follow and to be followed by others (Huberman et al., 2009). Reciprocal following relationships connect participants and create sub-networks of users with a mutual interest in forming a connection. The experiences of participants within these small world sub-networks on twitter have not been widely studied to this point. The purpose of this case study was to describe the participant experiences of a sub-network of approximately 3,100 twitter users who share a reciprocal following relationship with user *edtechtalk*. The case study focused on research questions related to the nature of the communication and interaction occurring within the sub-network, why users participate, and how users represent themselves within the sub-network. From the collection and analysis of observations, user profiles, and interview data, an explanation about the sub-network emerged which is related to the key themes raised by the research questions, namely (a) the nature of the communication, (b) the nature of the interaction, and (c) motivations to participation.

Nature of Communication

The twitter sub-network communication is best described as an always on and always accessible stream of communication. Within this stream of communication is a mix of broadcast messages and publicly viewable one-to-one conversations that focus on the sub-networks shared interest in education and technology.

Nature of Interaction

The interaction with the twitter sub-network is characterized by levels of friendships and relationships. Transparency is central to the sub-network's interactions as self-disclosure is

needed for relationship formation and development. Tied to transparency is awareness of the public audience which seems to influence interaction norms within the sub-network.

Motivation to Participate

Access to people, information, and resources appears to be a primary motivation to participate on twitter. Participation is driven by the desire to be part of a learning or professional development network which places the user within what one participant described as a global community of practice. In turn, participation becomes a contribution toward network membership.

Conclusions

Implications of Study

Through the collection and analysis of multiple sources of data, this case study explores participant experiences within a sub-network of twitter users. Within an always on and always accessible stream of communication, participants interact through a mix of broadcast messages and publicly viewable conversations around an online social network that has been described in other studies as a *virtual coffee machine* (Ebner & Schiefner, 2008). As suggested by Granovetter (1973) network tie hypothesis, the twitter sub-network is comprised of both clusters of strong tie relationships and by weak tie acquaintances. Through shared interest communication and interaction on and off the platform, weak tie relationships develop among participants that form a global shared interest sub-network. As was seen in prior studies of twitter (Huberman et al., 2009; Java et al., 2007), new weak tie relationships are formed by browsing friends of friends and from searching profiles for those with common interests which results in various levels of network relationships. As was found in studies on blogging (Nardi, Schiano, Gumbrecht, & Swartz, 2004), instead of engaging in private two-way dialogue with strong tie

relationships, messages made on twitter are publicly broadcast to a network of both strong tie colleagues and weak tie acquaintances.

However, unlike research on Internet-based social networks such as facebook.com (Golder et al., 2007), twitter users appear willing (and often eager) to build new relationships with those outside of their strong tie relationship clusters. As seen in this case study, transparency appears central to the weak tie relationship formation. A high level of user self-disclosure is required to facilitate the new relationship screening process. While access to people, information, and resources serves as a primary motivation to participate, reciprocity (in the form of the user's own participation) becomes network currency and payment for membership to the sub-network. As such, an awareness of a public audience appears to foster and sustain the interactions and professional relationships.

Significance of Findings

These findings are significant for the description of the communication and interaction within a twitter sub-network that formed *organically* over a period of years around shared interests. This case study also suggests drivers behind the on-going network participation. Yet, it is important to note that it is not appropriate to generalize that the described experiences, communication, and motivators are shared by other twitter sub-networks. In addition, it remains unknown whether a twitter sub-network *created* by a teacher within a learning group would result in an effective backchannel to the traditional course lectures and discussions, as some educators suggest (Costa et al., 2008).

Recommendations for Future Practice and Research

As advocated by some (Dunlap & Lowenthal, 2009), an effective educational practice may be to introduce students to an existing network of practicing professionals as an optional

means of making shared interest connections outside the learning group. Yet, it is unclear whether learners in a course would be willing (and able) to pay the network's cost of admission through reciprocal participation. Also, is the required level of user transparency and self-disclosure feasible in most educational settings? Would an experienced professional be willing to interact with a novice and, if so, would the communication and interaction be at a meaningful level? While the description of this sub-network aids in our overall understanding of the nature of hidden social networks and motivations for participation, further research is needed to examine whether the network characteristics and participant motivators exist in other contexts and settings.

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Introductory Letter to Potential Study Participants

(Purpose and Use: Informed consent appears on the screens before the online interview)

PROJECT TITLE:

Twitter.com Sub-Network Case Study

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INTRODUCTION

The purpose of this form is to give you information that may affect your decision whether to participate in this research and to record the consent of those who agree to participate. Several studies have been conducted looking into the subject of Internet-based social networks. As seen in prior research involving the twitter.com micro-blogging platform, hidden sub-networks are formed within the larger social network when users have the ability to follow and to be followed by others. Reciprocal following relationships connect participants and create sub-networks of users with a mutual interest in forming a connection. To date, no study has closely examined the experiences and perceptions of individuals in an organically formed sub-network on twitter.com. The purpose of this case study is to describe the participant experiences of a sub-network of twitter.com users who share a reciprocal following relationship with user *edtechtalk* and who share a common interest in education and technology.

If you decide to participate, you will join a small group other participants to share your perceptions of communicating and interacting on twitter.com. The research includes a brief online interview that you can complete on your own time. It is estimated that the online interview will take participants approximately 15 minutes to complete.

RISKS AND BENEFITS

RISKS: If you decide to participate in this study, then you may face a risk of breach of confidentiality. However, the researchers try to reduce these risks by replacing participant names with a coding indicator and by not sharing identifiable private interview responses with anyone outside of the research team. Yet, as with any research, there is some possibility that you may be subject to risks that have not yet been identified.

BENEFITS: The information gained from this study will add to our understanding of communication and interaction occurring in sub-networks on twitter.com. You and other participants who chose to participate on twitter.com will benefit from the insight gained in this study about user' perceptions and participation on the social networking platform.

COSTS AND PAYMENTS

The researchers are unable to give you any payment for participating in this study.

NEW INFORMATION

If the researchers find new information during this study that would reasonably change your decision about participating, then they will give it to you.

CONFIDENTIALITY

The researchers will take reasonable steps to keep private information, such as information that is collected in interviews, confidential. The researchers will replace names with coding indicators and not share identifiable private information collected during this study with anyone outside of the research team. The results of this study may be used in reports, presentations, and publications. However, the researchers will not identify you. Of course, your records may be subpoenaed by court order or inspected by government bodies with oversight authority.

WITHDRAWAL PRIVILEGE

It is OK for you to say NO. Even if you agree to participate now, you are free to walk away or withdraw from the study -- at any time. Your decision will not affect your relationship with your instructor or your university, or otherwise cause a loss of benefits to which you might otherwise be entitled. The researchers reserve the right to withdraw your participation in this study, at any time, if they observe potential problems with your continued participation.

COMPENSATION FOR ILLNESS AND INJURY

If you agree to participate, then your consent in this document does not waive any of your legal rights. However, in the event of harm arising from this study, neither Old Dominion University nor the researchers are able to give you any money, insurance coverage, free medical care, or any other compensation for such injury. In the event that you suffer injury as a result of participation in any research project, you may contact Jennifer Maddrell at (646)-283-6813 or Dr. George Maihafer the current IRB chair at 757-683-4520 at Old Dominion University, who will be glad to review the matter with you.

VOLUNTARY CONSENT

By agreeing to be a part of this study, you are saying several things. You are saying that you have read this form or have had it read to you, that you are satisfied that you understand this form, the research study, and its risks and benefits. Feel free to print a copy of this letter for your records. The researchers should have answered any questions you may have had about the research. If you have any questions later on, then the researchers listed above should be able to answer them

If at any time you feel pressured to participate, or if you have any questions about your rights or this form, then you should call Dr. George Maihafer, at 757-683-4520, or the Old Dominion University Office of Research, at 757-683-3460.

If you do not agree to be a part of this study, then close this page to exit this online form. If you agree to be a part of this study, then select "Yes, I agree to be a part of this study" below which will take you to the online interview.

Do you agree to be a part of this study?

- Yes, I agree to be a part of this study. Name _____
- No, I do not agree to be a part of this study

Correspondence with Participants

Introductory Tweet via Direct Message

Sent from twitter.com user JenM: “I’m a doctoral student conducting a study about twitter and would like to have your input. Click for details [URL to introductory page of online interview at surveymonkey.com]”

Introductory Page of Online Interview

“Thank you for clicking! We really hope you will take a few moments out of your busy day and share your input in our study of twitter.com. You were selected for this study based on your use of twitter.com and due to your reciprocal following relationship with fellow twitter.com user *edtechtalk* (you follow and are followed by *edtechtalk*).

We are interested in finding out about your participation on twitter and have developed an online interview to capture your perceptions. The online interview that follows was designed to take about 15 minutes to complete.

Before we move to the interview, we must first provide you with specific details about the study and confirm your consent as a study participant. By clicking “next” below, you will proceed to an Informed Consent form which outlines study’s details. At the end of consent form, you will be asked to agree or decline to participate. If you agree, you will be taken to the online interview. Otherwise, you will exit the interview.

If at any time you do not wish to proceed, simply close your browser tab and you will exit the interview. Click “next” to proceed to the Informed Consent form.”

[Informed Consent Form]

Instructions [first page of online interview]

“We are so pleased that you have agreed to participate in our research! The online interview that follows was designed to take about 15 minutes to complete. The questions are open ended with room to write as much as you would like. While you may have a little or a lot to say depending on the question, please try to write at least a sentence or two for each question”.

[Interview Questions]

Thank You [last page of online interview]

“Thank you for your participation. Your input will help us to better understand user perceptions and participation on twitter.com. Feel free to contact the researchers with any questions.”

Interview Questions

Background Information

Why do you think you originally began following *edtechtalk*?

Describe your affiliation (if any) with education.

Twitter Use

How did you learn about twitter?

Why did you join twitter?

Describe your participation on twitter (now and how it has evolved over time).

Describe how much time each day you spend reading the tweets of others?

Perceptions of Twitter

What do you tell friends or colleagues about twitter?

How do you benefit from being on twitter?

To what degree are you uncomfortable that your posts are read by others on the open Internet?

Why do you continue to participate on twitter.com?

Communication

How is communication on twitter similar or different from other types of online communication?

What is the impact of having only 140 characters per tweet?

Why do you think others read your tweets?

Community and Relationships on Twitter

Describe how you decide to follow others on twitter?

Describe the sense of community (if any) you feel on twitter?

What proportion of those you follow on twitter have you met face-to-face?

To what extent do you consider others on twitter your friends?

