Title Page

Title: Why Students Use Social Networking Sites After Crisis Situations

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Why Students Use Social Networking Sites After Crisis Situations

ABSTRACT

Communities respond to tragedy by making virtuous use of social networking sites for a variety of purposes. We asked students to describe why they used a social networking site after the tragic shootings at Virginia Tech, then evaluated their responses using content analysis. Students went predominately to Facebook (99%). Most (59%) of the 426 students that responded went there because their friends were already there, and to find out if their friends were OK (28%) (and to let them know they were OK). Ideas related to relationships occurred more frequently in the responses than ideas related to the website's features. However, the ease of use of the website was mentioned often (22%). The results suggest this emergent phenomenon will recur.

Author Keywords

Social Networking, content analysis, crisis, qualitative data.

ACM Classification Keywords

H5.3. Information interfaces and presentation: Group and Organization Interfaces; synchronous and asynchronous interaction, evaluation.

Introduction

"Web 2.0" refers to collaborative and interactive websites, extending the WWW's content hosting services to facilitate communication and information sharing by individuals. Websites such as Facebook, Flickr, and MySpace provide a platform for users to browse contributions of their peers, participate in discussions, form focus groups, and share their perspectives through messages, photos, and videos. The wide distribution and variety of information communication technologies (ICT) that provide messaging, email, and instant-messaging – coupled with the extension of broadband always-on networks – have enabled an environment supporting levels of communication that have not previously existed. University students use the range of these ICTs comfortably and interchangeably to manage a myriad of social networks of friends and acquaintances.

Many say they use the Facebook site almost every day, and have the desire to share their social activities, ideas, and feelings, and see what their friends are doing. Using the site is one way that they are connected to their world. New advances in ICT thus are enabling emergent phenomenon of dynamically self-organizing groups that build parallel information grids to facilitate their interactions and form a virtual community with shared goals and needs (Vieweg et al., 2008).

Tragedies, e.g., floods, terrorism, and other atrocities, have occurred throughout history. Communities have responded to such events in various ways, with many examples of vigils, memorials, and archives demonstrating the desire to preserve the communal memory of those impacted by a tragic event. Responses to tragedy occur also through ICT because they are the contexts of modern life, i.e., people respond by joining groups in Facebook, because they and their friends are already there. Their

desire to belong to and connect with a group is a common response to tragedy. They know how to use the features of the Facebook site and they know that it can help them to support others and receive support.

The same desire to remember, that caused previous generations to write letters or poems and treasure them, leads current generations to create and upload digital photos and videos. Today people make virtuous use of social networking and other internet software to respond to tragedy in creative and dynamic ways. For example, the Facebook group of April 16th 2007, "I'm OK at Virginia Tech," rapidly provided information that assured many students that their friends were OK.

> "Though the initial purpose of this group was to simply join, thereby making one's own safety publicly known, I'm ok at VT, grew to serve a second purpose of supporting searches for and offers of information about VT students. Members asked about friends and acquaintances, and acted on behalf of others searching for relatives." (Vieweg et al., 2008, page 45)

Such spontaneous ad hoc responses to grief, stress, and confusion demonstrate how desperately people need to communicate and obtain information in such situations. The ability of the group to spontaneously support the needs of the community is indeed a positive side effect of the social networking sites. The achievement of identifying the students shot before the official announcements clearly demonstrates the potential capabilities of such self-organizing technology-enabled group activity. It seems this use of Facebook contributed to reducing stress for many students and other members of the community, by providing information that previously would have been much more difficult to obtain. This study investigates students' perceptions to provide insights into why a social networking website was used in response to the tragic shootings at Virginia Tech. We show that despite their achievements, members intentions were more mundane, simply to be with the friends and know they are OK in the time of crises.

Literature Review

Facebook was founded in 2004 by Mark Zuckerberg, then an undergraduate student at Harvard University. Originally, the site was created solely for Harvard students, but shortly expanded as a social networking site for all college students with a valid college e-mail address. In September 2005, Facebook expanded to include high school students (Boyd and Ellison, 2008). The interactions enabled by social networking websites (SNS) facilitate developing one's social network by viewing his/her network in ways that were not possible until recently and providing for sharing that network with others. This enables the information contained in the network and the information continually generated by the people in the network also to be shared. Perhaps this enhanced level of sharing results in stronger community ties or other characteristics that draw students to these sites. Today, any individual with a valid e-mail address is able to create and use a Facebook account. As of the time this document is written, Facebook is viewed by many as the most popular social networking site within the United States.

As of June 2009 there are more than 200 million active Facebook users and the average user has 120 friends on the site. More than 28 million pieces of content (web links, news stories, blog posts, notes, photos, etc.) are shared each month. In addition, more than 100 million Facebook users log into the site each day (Facebook.com, 2009).

Since inception, investigations into the use of Facebook and other SNSs have been a popular area of research. Several studies have reviewed how Facebook can be used to measure psychological well-being and the development of social capital in an online community (Ellison et al., 2007; Steinfeld et al., 2008; Valenzuela et al., 2008), in addition to discussing the various gratifications users may derive from Facebook (Joinson, 2008). Other studies have analyzed the strength of friendship networks both online and offline (Bryant et al., 2006; Tom Tong et al., 2008), particularly how these relationships impact self-esteem (Zywica and Danowski, 2008).

The emergence of social networking sites (SNSs) has had a profound impact on communication and information exchange. Due to the convenience and popularity of SNSs, e.g., Facebook, users are able to maintain contact with numerous people ranging from their strongest relationships with family to weaker relationships with acquaintances from various aspects of their lives (Boyd and Ellison, 2008). The phenomena behind social networking lie in the ancient ability and desire of people to be part of social groups, e.g., clans, tribes, companies, or nations. In modern life the potential opportunities for affiliations are many. Being part of a social network means communicating with others in the network and participating in community activities (Boyd and Ellison, 2008). According to respondents from previous studies, one of the primary uses of Facebook is to help the user "keep in touch" with friends who are away from home or other people with whom the user may have lost contact (Joinson, 2008). Due to its easy-to-use design, Facebook is also used to "re-acquire lost contacts" for "communication" by "perpetual contact" and "instantaneousness of information" (Joinson, 2008).

In times of crisis, individuals bond together in groups to provide support for one another. Such groups are inherent in the Facebook community (Vieweg et al., 2008). Groups such as "I'm OK at VT" were formed for the purpose of information sharing and community. A previous study conducted extensive research on the events of April 16, especially concerning the group "I'm OK at VT." It found that students joined the group not only to make their own safety known, but also to support searches for and provide information about other students (Vieweg et al., 2008). Other sources, though they didn't study the use of Facebook during the VT tragedy, recognized the important role Facebook played in helping students cope and communicate during the VT tragedy. Zywica and Danowski discussed the "Social Compensation" hypothesis in which Facebook users attempt to increase their Facebook popularity to compensate for inadequate offline popularity (Zywica and Danowski, 2008). Meanwhile, Pelofsky reported in a short article that the "I'm ok at VT" group had become a bulletin board for VT students (Pelofsky, 2007).

Method

We conducted an online survey focused on understanding the use of ICT after a crisis after the shootings at Virginia Tech. We used the Dillman method (1978, 1999) in administering the online survey. Specifically, we sent an initial email to the randomly selected sample of students alerting them to the study, and letting them know that we would be sending a link in the next email to the online survey. A few days later, we sent another email to them with a link to the survey. We sent two follow up reminders about two weeks and four weeks later. Of the 2000 requests sent, 545 responses were received, for a response rate of 27%.

We asked the following question, that frames the current study:

If you used a social networking website to communicate to others that you (or they) were safe or OK, which website did you use first? (identify the website, then briefly - 1 or 2 sentences/phrases - explain why you selected this website)

Four hundred twenty-six respondents provided text responses to this question. We evaluated these responses using a content analysis approach (Krippenforf, 1978).

We randomly selected ten percent of the responses and evaluated them to identify the ideas, beliefs, or concepts that participants were trying to convey. Two researchers independently evaluated these responses to derive initial sets of keywords that captured the variety of the ideas, beliefs and concepts contained in the responses. The resulting sets of keywords and their definitions were merged to identify the initial set of keywords for the content analysis coding.

A random sample of ten percent of the responses were selected and three coders (including the two researchers) independently coded these responses using the keywords and definitions. The assignments of keywords to responses were evaluated to identify coding rules that describe when each keyword should be assigned to a response. The goals of this process were to be sure all of the ideas provided in the responses were included and to develop a shared understanding among the coders of how to apply the coding rules.

We then selected a second random sample of ten percent of the responses and used them to determine the inter-rater reliability of the coding scheme. Each of the three coders independently coded the second set of responses. The results of this coding were used to calculate the agreement among coders. All three coders then independently coded all of the responses. Table 1 column 3 shows the inter-rater agreement for the final coding for each keyword using Fliess's Kappa (Fliess, 1978; Sim and Wright, 2005). Six of the keywords reached the highest level of agreement with Kappa > .8 including: Belong, Easy, Groups, OK, Reliability, and Status. Substantial agreement, Kappa > .6, was achieved for four keywords including: Friends, OnlyWay, Personal Messages, and Wall. For the MassComm keyword coders had moderate levels of agreement, Kappa > .40, while exhibiting fair agreement for Networks and only slight agreement for the GetInfo keywords. Over all keywords coders achieved substantial agreement with Kappa=.69, thus inter-rater reliability was deemed acceptable (Landis and Koch, 1977). A keyword was said to be assigned to a response if two of the three coders independently assigned the keyword to the response.

Results

We summarize the findings in several sections, including the keywords and definitions, exemplar responses, frequency of the ideas represented by the keywords, and the co-occurrence of keywords in responses that included multiple ideas. Facebook was the site identified by 99% of participants. Sixty-five percent of respondents were female and 91% were white. There were no sex or race differences in the number of keywords identified or the frequency of any keyword.

We found that students went to Facebook for a variety of reasons, first among them was their friends also were using Facebook. They also went because they already had a page on the site, believe the site is easy to use, wanted to reach multiple people at once, and aimed to reach people in multiple social networks.

We examined the co-occurrence of ideas represented by the keywords by creating a matrix that shows the level of agreement in assignment for each paired comparison of the keywords. Such a matrix

reveals that ideas represented by keywords appeared together in the thinking of the participants. By examining these co-occurrences we identify potential patterns of relationships among the ideas represented by the keywords.

Definitions of the Keywords

The keywords and definitions show the range of ideas represented in the participants' responses. Table 1 contains the keywords and definitions. The ideas contained in the responses included comments about the website, issues related to the shootings, and techniques for communicating using SNS. The ideas presented for website characteristics, e.g., Easy-to-use, Wall, or Status features, show a focus among the participants on the website, we refer to these issues as mechanistic. Issues related to contacts and the desire to let people know that you were OK, get information about the crisis, and that they belong on the site are related to the relationships maintained through the site, we refer to these issues as relationship centric. Issues related to communications techniques include the ability to reach multiple networks of friends, make mass communications, or that the website may be the only way to reach some of their contacts. The thirteen keywords identified and their definitions were used to understand the responses of the participants and reveal why they used a SNS in response to the crisis.

Exemplar Responses

For each keyword some responses most accurately reflect the ideas represented by the keyword. We include some of these items for each keyword in the Appendix and discuss them briefly in this section.

Belong is among the simplest keywords to understand. This keyword was coded when participants indicated they went to the site because it was the only one to which they belonged at the time.

The **Easy** keyword indicates the participant used the site because they see it as easy to use. Easy to use also includes that it is easy to communicate using the site and that it can be done quickly.

The **Friends** keyword was the most frequently occurring idea in the responses and the dominant reason that participants used the site they chose. As shown in the first exemplar for this keyword in the Appendix, participants went to the site because they knew/believed their friends would be there. Perhaps they believed they would find some comfort in communicating with the people in their social network at the time of crisis.

Get info refers to the idea that some participants went to the site to find information about others and about the crisis. The content posted by participants often includes links to personal descriptions, news stories, or photos that helped them to understand the situation from a variety of perspectives. A dearth of information is common in crisis situations as is an increased desire for understanding and higher perceived need for information.

Table 1: Coding keywords, definition, inter-rater agreement, and frequency of occurrence.

Keyword	Definition/Idea Represented	Fleiss' Kappa	Percent of Responses
Belong	This is the only social networking website where the respondent has a page or they say that they had an account at the time.	0.85	28%
Easy	Easy (and/or quick) way to contact people or saying I know how to use Facebook.	0.85	22%
Friends	Friends and other peers use this particular social networking website, must have thought that friends are on this site. The reference to "everyone" means their friends.	0.73	59%
GetInfo	Went to the site to get information or provide information. Mention the site was the best way to give information.	0.11	4%
Groups	Joined groups to connect with others.	0.94	5%
Mass Comm	Wanted to reach many people at once, must have the intent to contact many people. Not make a direct connection with individual.	0.51	10%
Networks	Wanted to reach friends in different networks (i.e., high school network, college networks, etc.)	0.36	7%
OK	Idea that they went to the site for the purpose of letting others know they were OK or checking if others were OK.	0.90	28%
Only Way	For some who lost touch with friends, this was the only method of communication available.	0.65	2%
Personal	Personal messages to or from individuals were utilized.	0.68	10%
Reliability	Cell phone or other services were unreliable; however, the internet and social networking websites were online the entire time.	0.95	8%
Status	Indicates that they used the public status feature to provide or receive updates.	0.94	11%
Wall	A general post could be left on one's own "wall" indicating they were OK. Ability to post single message for all friends to see. Anytime posting is mentioned. Includes writing on people's profiles.	0.68	5%

The **Groups** keyword identified responses that mentioned the use of the groups feature in Facebook. They discuss how groups were used to identify those injured and to list those that were OK.

They include specific statements about seeing that friends had joined the group and knowing they were OK. Thus, it seems clear that SNS technology reduced stress for some members of the community, by allowing them to know their friends were OK.

Responses assigned the **Networks** keyword mentioned the use of Facebook for reaching multiple, and usually disparate, groups of friends, e.g., friends from home or high school versus friends from VT. While other ICT mechanisms provide this capability, i.e., cell phones can be use to call people from both sets of friends, SNS support these connections more directly and completely, while other technologies require users to remember more to activate their multiple networks.

The **OK** keyword indicates that participants went to the site to let others know they were okay or find out if everyone they knew was okay. This was likely the most sent message of the day.

For some few respondents Facebook was the **Only Way** they could make contact due to a lack of connectivity through the cell phone network or missing contact information for other media such as email. It seems that having this capability to reach this group during the time of crisis would have the effect of reducing stress for the small number of participants that mentioned this issue, both sender and receivers.

The **Personal** keyword refers to using the website for sending and receiving messages directly between participants. Perhaps personal contacts were used with people in strong relationships, i.e., family and close friends, where the use of a broadcast message or impersonal posting seemed inadequate.

The **Reliability** keyword refers to the inability to make connections using the cell phone network on the day of the crisis. Soon after the crisis became public, cell phone networks became saturated. This resulted in many difficulties in connecting and frustration for users that have become accustomed to the ubiquity and very high availability of cell phone networks in normal times. The ability of the computing infrastructure to remain operable during the crisis greatly facilitated communications. The information accessibility provided by Facebook, e.g., one participant indicated "you can find an email address from a Facebook page", likely facilitated communications beyond those conducted using the features of the website.

Setting **Status** in Facebook is an indicator of accessibility. This feature was used by many students to indicate they were OK and determine if their friends were OK, without needing to make direct contact. This resulted in a highly efficient communication of critical information, albeit somewhat lacking in personal intimacy.

The **Wall** in Facebook is a feature that provides for direct asynchronous communication among users. It requires a response from the receiver of the posting to acknowledge the sender's intent, thus it is similar to email in that senders do not know the contact has received a message until a return message is received.

The exemplar responses in the Appendix provide an overview of the types of response provided by participants and show the range of ideas in the words of respondents. Review of the keywords suggests that some of the keywords reference ideas related to the relationships users maintain through the website, while others are related to the mechanisms provided by the website that facilitate communications. For example, the Friends and OK keywords represent a relationship and a message, similarly Getinfo is a goal of users of the website, as is reaching multiple networks of friends. The Belong keyword also is suggestive of a goal related to maintaining relationships using website. These keywords relate to the goals that lead participants to the website. Alternatively, the Wall, Status,

Personal Messages, Groups, and Masscomm keywords describe various tools available through the website, with the Easy keyword describing the use of the tools and Reliability is a statement about being able to depend upon the system. Together, these keywords represent how the website is a mechanism for users to accomplish their communication goals.

While the relationships and mechanisms perspective seems a useful way to summarize the ideas represented in the responses, we are also interested in the prevalence of the various ideas. We examined how many times each keyword was assigned to a response to determine the extent these ideas are shared across the respondents.

Keyword Frequency

Each keyword could be assigned only once to a single response. That assignment means that the individual response contained the idea represented by the keyword. Thus, keywords that occurred more frequently than others were indicated by more participants.

Table 1 column four shows the percent of responses to which each keyword was assigned. Figure 1 depicts the frequency of keywords. Figure 1a presents a tag cloud visualization of the keywords scaled by the number of responses where the font size of the keyword shows the percent of responses that included the idea represented by the keyword. Larger words occurred more often. Of all respondents who participated in our survey, 59% cited friends or peers as one of their reasons for utilizing Facebook on April 16th. This dominance is to be expected, as the primary uses of social networking is to keep in contact with friends, family and other acquaintances. Of the respondents, only 28% explicitly stated they used Facebook for the purpose of letting others know they were OK or checking to see if others were OK. Yet, we believe it likely that this was a motivation for many students that used the site on that day and is suggested by the co-occurrence analysis. Additionally, 28% of the respondents stated that they used Facebook because it was where they belong to the social network. The three most occurring keywords are all related to participants' goals related to their relationships, rather than the mechanisms of the website.

Smaller numbers of respondents used Facebook for purposes of mass communication, to get information about others, or to send/receive personal messages with relative keyword frequencies of 12% for MassComm, 11% for GetInfo, and 10% for Personal Messages. All of these ideas directly address the communication medium provided by SNS and that these issues are substantially less often mentioned than the relationship keywords.

The ability to reach multiple and disparate social networks was mentioned by 7% of participants. This unique aspect of SNS, i.e., the way that contact information is collected and organized on the site, may be particularly useful during crises when the information is needed quickly and easily.

Just 2% of respondents said they used Facebook because it was the only way to reach some of their friends and family. Considering the prevalence of all the other various forms of electronic communication such as cell phones, email, and instant messaging it seems unlikely that SNS could be the only contact method accessible. However, cell phone networks quickly became saturated during the crisis, while email and the internet continued to work. Eight percent of students explicitly mentioned the reliability of the site (and often indicating the lack of reliability with cell phones) in their responses.

Figure 1b shows the frequency differences in the relationship related keywords on the left side and with higher percentages and the mechanistic keywords on the right with lower percentages. These

results suggest that the respondents used the website during crisis (as in normal time) for the relationships they maintain using it rather than any specific features of the site.

Figure 1a: Percent of responses that included each keyword. (Larger font size indicates greater frequency, normal font indicates relationship keyword and italic font indicates a mechanism keyword).

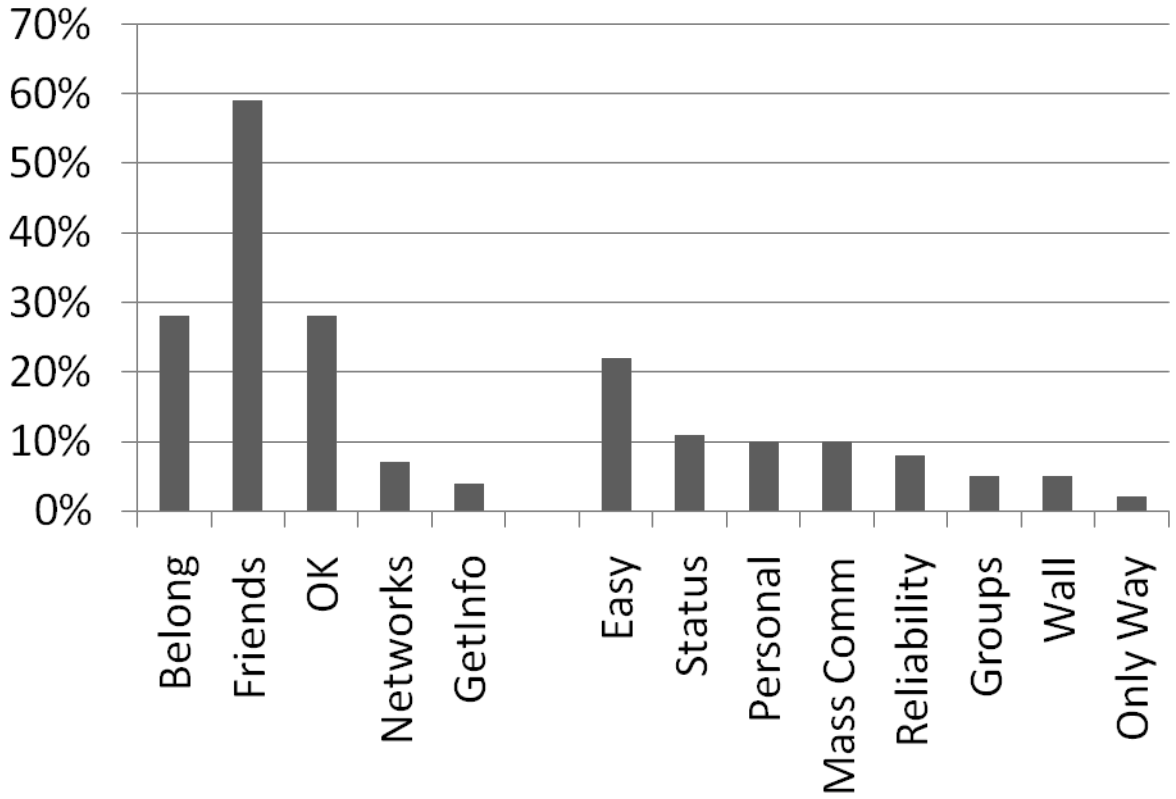

Figure 1b: Percent of responses that included each keyword histogram, relationship keywords on left, mechanistic keywords on right.

In addition to the frequency of keyword assignments to responses, we also evaluated how often keywords occurred together in the responses. When multiple keywords are assigned to a single response it suggests the ideas represented by the keywords are related. The next section presents the results of the analysis of keyword co-occurrence.

Keyword Co-occurrences

Many responses included multiple ideas and were assigned multiple keywords. If multiple keywords were contained in a response, it is possible that the ideas were related in the mental model of the respondent. Two-hundred sixty-eight responses were assigned more than one keyword (167 were coded as related to only one keyword). Seven keywords was the maximum number assigned by at least two of three coders to a single response. This response is presented below:

> *Facebook - I had received many messages from friends, and even people I hadn't talked to in a long time asking if I was okay. This was the easiest way to communicate back to them that I was safe for two reasons. 1 - The cell phone system was so busy, many calls could not get through 2- I didn't have many of the acquaintances phone numbers*

This response reveals the co-occurrence of keywords and was coded to include the following keywords: Easy, Friends, Networks, OK, Only Way, Personal Messages, and Reliability. Comparing this statement to the definition in Table 1 shows how the keywords were assigned to responses. For example, this statement was coded Friends because the respondent explicitly states friends whereas Easy was coded due to the phrase in the second line of the response. Reliability was coded because the respondent states they used Facebook because the phone system was busy, and Only way was coded because they didn't have other forms of contact information for some people. We analyzed this co-occurrence data to identify the ideas that seem to be most often held by participants simultaneously.

To determine the significance of the co-occurrences we used the crosstab procedure in SPSS to calculate the significance of the Chi square statistic for each keyword pair. This process identified 23 keyword pairs that were significantly related of the possible 65 combinations. Table 2 shows the results of this analysis. In the table each cell contains the X^2 value, significant values are shown in bold.

Table 2: Keyword co-occurrence comparisons. (X^2 values, significant overlap shown in bold)

	Be-long	Easy	Friend	Get-Info	Group	Mass-Comm	Net-works	OK	Only-Way	Per-sonal	Rel.	Stat-us
Belong												
Easy	3.62											
Friends	**30.82**	**25.23**										
GetInfo	**9.30**	**13.35**	0.40									
Groups	3.28	1.83	2.30	4.39								
MassComm	0.29	**26.36**	3.71	1.26	1.49							
Networks	**13.67**	2.83	**39.28**	1.86	0.12	0.05						
OK	2.62	**15.65**	**7.86**	**15.42**	**34.41**	**34.97**	2.84					
OnlyWay	1.26	0.66	1.38	0.00	0.45	1.20	15.33	0.00				
Personal	0.75	0.00	0.00	0.09	0.70	0.44	0.92	**31.01**	1.68			
Reliability	1.86	3.60	2.16	0.04	0.25	0.00	0.00	**8.15**	**8.05**	0.20		
Status	**14.04**	1.97	1.61	**9.21**	0.01	**14.23**	0.99	**110.1**	1.11	0.05	1.80	
Wall	0.40	0.69	0.79	0.08	0.02	**11.91**	0.04	**42.12**	0.55	**16.44**	0.50	0.91

Figure 2 shows graphically these significant co-occurrence relationships among the various ideas represented by the keywords. A line connecting two keywords means the keywords were assigned to many of the same responses. With 9 of the 23 relationships the OK keyword is the most commonly shared keyword and the major focal point of Figure 2. It is connected to 9 of 12 keywords, excepting Belong, Networks, and Only Way. Seven keywords were related to four other keywords including Belong, Friends, GetInfo, Easy, Mass Comm, Status, and Wall. OK occurred with six mechanistic keywords versus three relationships keywords, perhaps reflecting a focus on how to send their message in the context of the system.

These findings suggest respondents used Facebook on April 16 as a means of contacting friends and family (Friends) and as a way of letting others know that they were safe (OK). They did this by utilizing the various features of Facebook by checking others' profiles, posting their status, writing wall posts, utilizing personal messages, and contacting multiple people with one action.

The co-occurrence of Easy with Mass Comm suggests a feature of SNS that was needed on the day of the crisis. The connections of Mass Comm with Status and Wall show how mass communications were achieved. Similarly the easy way to get information was through the status feature. Finally, Easy

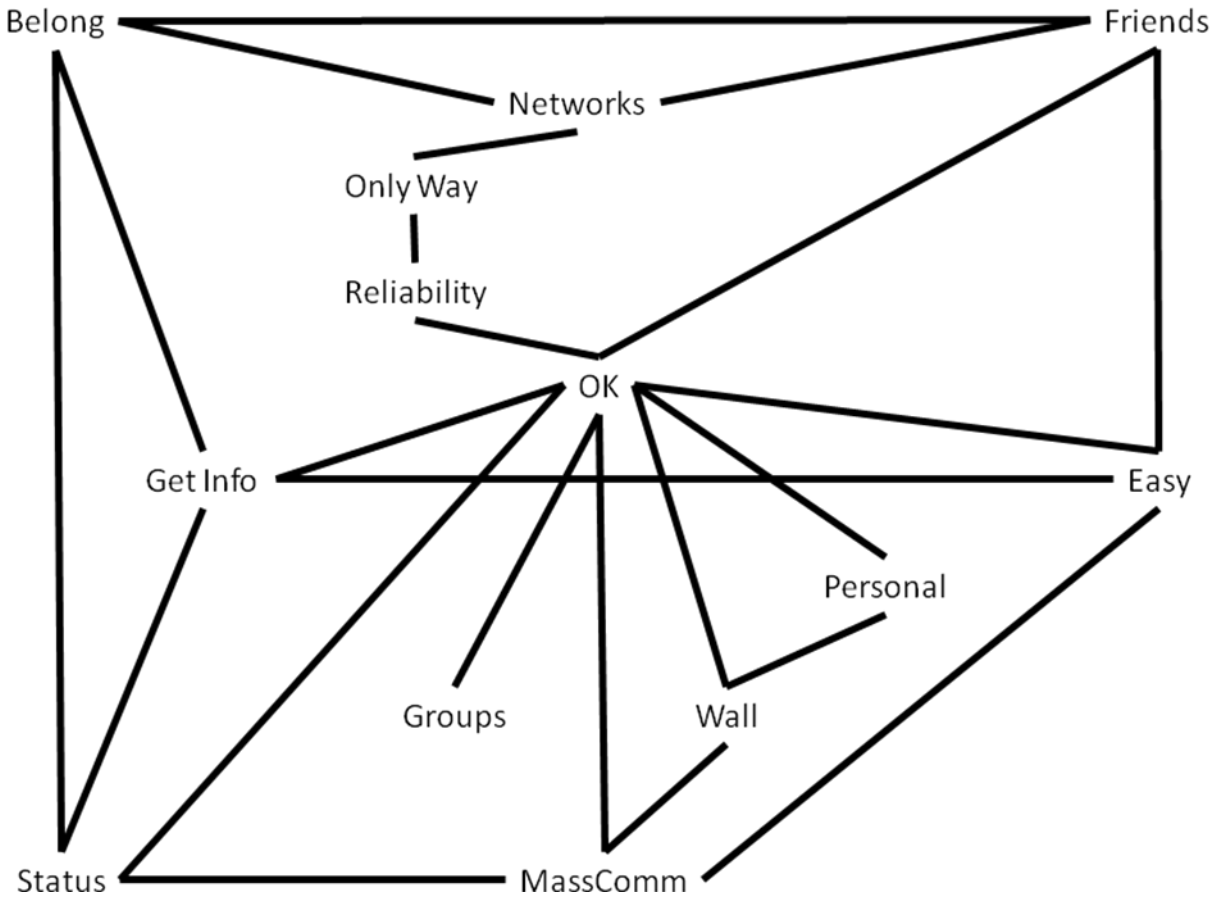

Figure 2: Significant keyword co-occurrences.

is related to Friends, which was the most frequently identified keyword. This suggests that perceived ease of use also contributed substantially to their use of the SNS on the day of the crisis. They knew that the capabilities of Facebook would work for sending the I'm OK message to their friends and believed they had the capability to use the system to do so.

Discussion and Implications

The findings of this study reveal that in a time of crisis, individuals used Facebook as a means of sharing and gathering information by utilizing their various networks of friends. That is, individuals used Facebook during a crisis in the same ways in which they ordinarily use it in everyday life. Individuals go to Facebook out of convenience; it is a fast and easy place to go to each day to contact and keep in touch with friends. This was certainly true on April 16, when Virginia Tech students turned to Facebook as their preferred social networking site in an effort to communicate quickly and easily with the greatest

number of their friends and family about the status of one's safety. This study reveals that in a moment of tragedy, VT students used the various Facebook tools and applications such as wall posts, status updates, and personalized messages to let the greatest number of their friends and family know that they were safe. Facebook further allowed users access to multiple networks of friends and served as the preferred SNS because it is reliable, supports communication mechanisms, and is easy to use. Groups were used not to make or enhance individual contacts but to show support and connection with the community of VT.

Technology, including Facebook, allowed more people to know more information about more aspects of the crisis more quickly than ever was possible in a previous crisis. Using Facebook people could know their friends were okay without contacting them directly, thus changing the duration of such an inquiry to one mouse-click on Facebook compared to a series of cell phone calls or email messages. This eliminated time spent, and perhaps some frustration, waiting for a cell phone connection, which was substantive until late in the day of the crisis, and the time required for communication when a call was answered. In addition, calling or emailing could entail continued not knowing when a call was answered by voice mail or due to common delay in exchanging email messages. Thus, it seems possible that someone could learn about the status of friends using Facebook more quickly than other methods. In addition, crises often cause phone network saturation resulting in times where it is difficult to obtain connections, causing frustration and increased stress. Under these conditions the use of Facebook for a purpose for which it was not intended may have reduced stress. Nevertheless, for close ties other research has indicated a desire to hear the voice of a communication target rather than use only text messaging (Sheetz et al., 2009).

Overall our results suggest participants perceived Facebook as valuable during crisis. People wanted to ensure their friends at VT were okay, let them know they were okay too, and reach their non-VT social networks to let them know they were okay. To do this people wanted/needed to communicate with multiple people simultaneously, send personal messages to individuals, and get information about people, using reliable, easy to use technology. These needs were/are supported by the status, wall, groups, and other features of Facebook using internet infrastructure.

Students' prior knowledge of how to use the system and the alignment of perceived communication needs and system capabilities facilitated the seamless virtuous use of the system in an extreme situation. That is, the community adapted the features of the tool to their information needs. This suggests a potential for similar use of Facebook and other SNS to impact future responses to crises.

The use of Facebook groups identified by Vieweg et al., (2008) in the aftermath of the VT crisis was not mentioned often by our respondents at 5%. Although we believe it is likely that a substantive percentage posted they were okay to those groups or perhaps used them to search in some way. It seems that the community may not have fully appreciated the significance of the collective phenomena in which they participated.

This study further reveals the various ways in which Facebook and social networking can be utilized in the event of a tragedy, despite assertions by Facebook denying usefulness for such activities (Alessandro and Gross, 2006). This study confirms findings of previous studies conducted concerning Facebook and social networking. The various uses of Facebook on April 16 further reveals that individuals use the social networking site in times of tragedy to find out information about their peers and classmates (Alessandro and Gross, 2006; Joinson, 2008) and for making it more convenient for people to get in touch with them (Alessandro and Gross, 2006; Ellison et al., 2007; Joinson, 2008). Facebook also provided an excellent way of contacting and keeping in touch with friends who live far

away. With all of the communication and social networking advantages provided by Facebook, it isn't hard to see why Facebook has become part of everyday life for many individuals (Lampe et al., 2008).

Future Research

We expect that using Facebook during the crisis reduced the stress of many students. That is, many were able to use the system to determine that their friends were OK before the list of victims was announced by authorities, thereby reducing the length of the period of anxiety. Future research focused on stress may reveal that the existence and use of such systems serve to reduce stress. The keywords identified here provide a framework for determining what aspects of the SNS users find most important and perhaps how they can be improved for use during crisis.

Further research is needed to determine the aspects of use that can best facilitate the types of communications needed and perhaps suggest additional features for implementation in popular SNS. It is particularly important that the emergent phenomenon be understood well enough for it to be facilitated where it will be useful in future crises. Similarly, there may be characteristics of this community, e.g., levels of connectedness or pervasiveness of technology that enabled the rapid adaptation of the technology. Such characteristics may not exist or be difficult to implement in other communities, which could mitigate the potential impact of the technology for responding during crises.

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Appendix – Keywords and Exemplar Responses

Belong:
1. Only social site I was a part of then.
2. Only social network site I use. Good way to trade information with lots of people.
3. It is the only social networking site I use.
Easy:
1. I already had an account and it was an easy way to let all my friends know I was safe.
2. Because that's the only one i had and it was easy to check on many people fairly quickly
3. It is the only social networking site I belong to. Plus, everyone seems to have one so it was the fastest and easiest to use.
Friends:
1. Most of my friends in college and from high school are all on it.
2. Because everyone I know uses it. It's easy to get in touch with someone.
3. Most connections with friends and family.
Get Info:
1. Everyone has it and you can tell if people are logged on, write them a brief message, or even sometimes find additional contact information.
2. I used this because almost everyone has a page and its easy to quickly to check on lots of people.
3. I could quickly find out things in an organized manner
Groups:
1. People were joining the I'm okay at VT group and once you saw your friends in the group, you knew they were ok.
2. I could see if my friends were ok, and join groups to find out who was ok and who wasn't.
3. Facebook had groups formed instantly to let people know who was injured or killed so that family and friends could stay up to date with information. it also allowed us to make sure our friends were ok because if they were on facebook or their profile had been updated, you knew that they were alright.
Networks:
1. Most of my friends from home, school, other areas of my life were all on there. It was the easiest way to reach them all at once.
2. All of my friends at Virginia Tech are friends with me on facebook.
3. Easy to contact friends I have all over the country/world
OK:
1. I used Facebook because it is the main one that college students use. And by the time I checked it there was already a group called Im Okay at VT to let me know a lot of people who were okay.
2. Facebook because all of my friends from high school have it and it was an easy way to tell them that I was ok.
3. I put up a status message saying I was OK. I selected this because it connects me with friends and family across the country.
Only Way:
1. I was already a member of this website and many of my high school and college friends were also on facebook. Some of my old friends don't have my college email, so that was the only way they could find out I was ok.
2. I used a website that all of my friends from other places in the country use, because I knew that is the only way I would be able to reach them.

3. *It was the only way I knew to reach the majority of my friends.*
Personal:
1. *I didn't really select this website myself, but it is what connects me with people at home or those I went to high school with [back in Baltimore, MD]... I received tons of messages from people I hadnt even heard from since middle school and took the time to respond to them and let everyone know what was up.*
2. *I used Facebook because I saw that many people writing on my wall and sending me personal messages to ensure my safety*
3. *It is the most commonly used social networking website among VT students and I had personal messages sent to me through my account that I was able to respond to.*
Reliability:
1. *I had received many messages from friends, and even people I hadnt talked to in a long time asking if I was okay. This was the easiest way to communicate back to them that I was safe for two reasons. 1 - The cell phone system was so busy, many calls could not get through 2- I didnt have many of the acquaintances phone numbers*
2. *Because all of my friends are on Facebook and it is easy to use. It was never tied up or inaccessible like the cell phone service at the time due to overload.*
3. *The landlines and cellphones weren't working and I didn't have everyone's email address. You can either contact people directly on the page or get their email from their Facebooks.*
Status:
1. *Because my close friends at tech that I couldn't get in touch with by calling I knew I could check their status and make sure they were okay*
2. *People quickly updated their status to show they were safe. cell phone networks were busy.*
3. *I put up a status message saying I was OK. I selected this because it connects me with friends and family across the country.*
Wall:
1. *I have been a member for awhile and i had many friends from other schools who contacted me via wall postings to share condolences and make sure i was alright*
2. *I used facebook to write on others peoples profiles to make sure that they were okay. I chose this method because most of the school also uses this method.*