

The Pennsylvania State University

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College of Information Sciences and Technology

**EFFECTIVE TEXT COMMUNICATION DURING A CAMPUS CRISIS**

A Thesis in

Information Sciences and Technology

by

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## ABSTRACT

This research focuses on media, particularly text messages and social media, during campus crises in hopes to better understand and improve communication methods and validate information for emergency management (EM) departments. The focus of this research includes where campus students, faculty, and staff physically go to once an emergency text alert is sent across to the campus. An additional research question includes who whom people confirm information, or where and with whom do people validate the information in the emergency text notification. Through a review of previous research, it was found that a gap exists in measuring the effectiveness of emergency text alerts at university campuses during an emergency crisis.

To further investigate this gap, data was collected using two methods: semi-structured interviews and a survey. The semi-structured interviews were used to gather information to help guide the development of the survey in regards to the needs of emergency management departments. The survey was distributed to students, faculty, and staff of The Pennsylvania State University. Findings indicate the kind of actions taken when receiving an emergency text alert during a campus crisis situation and what external resources are used to validate the alert information. Additionally, social media preferences were surveyed to help understand which social media outlets could help in emergency management.

This research is important for understanding the effectiveness of current strategies for emergency management departments on a university campus. However, the research will be able to extend to many mass-gatherings in the world, like sporting or political events.

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## Chapter 1

### Introduction

Previous research has suggested ways to improve technologies for emergency crisis alerts; however there is nominal research suggesting how to improve the effectiveness of these time-sensitive notifications (Han et al., 2015).

The purpose of this research is to focus on effective text communication during a campus crisis. Specifically, this research focuses on how effective text alerts are, and what external resources are used to confirm the information in the text alert. This research is important for all campus emergency departments and campus administrators to know how students, faculty, and staff respond to an alert from a campus text notification during a campus crisis.

This research was motivated by the following scenario and two research questions:

Scenario: Given an emergency crisis scenario on a college campus, what media platforms are used to confirm information, and how do they physically respond to the text alert information?

1. Do students, faculty, and staff listen to instructions provided in emergency text alerts?
2. What external resources are students, faculty, and staff using to confirm that information is true in the alert notification?

Pursuing these questions allows the researcher to improve communication methods for emergency management departments on college campuses. A semi-structured interview with emergency management subject matter experts is conducted to help develop a survey that is distributed to students, faculty, and staff of a rural mid-Atlantic university. The survey results and analyses are included in this research and have led to the researchers implications of the data. The



current communication methods of emergency management campuses can use the results and analyses to understand how effective current methods of text alerts are, what external sources are being used to confirm the information in the text alert, and what type of people can aid in the confirmation of information through social media during a campus crisis.

This research can also cover other mass-gathering events or large institutions beyond universities and colleges. Crimes involving places of high tourism, for example hotels near large cities, can use this research to aid effective communication to the people affected by the emergency (Pizam & Mansfeld, 1996). In situations where immediate action is needed from a large number of people, this research will be important to understand how to improve communication methods and reduce potential dangers during a live emergency crisis.

### **Thesis Organization**

The thesis outline is as follows:

- Chapter 2 consists of the literature review. Three major subtopics will be discussed:
  - campus crises,
  - effective communication, and
  - confirmation of information.
- Chapter 3 openly discusses the research question, hypotheses, and step-by-step methodology for this study.
- Chapter 4 includes the results and discussion of the results. An analysis of data, including comparisons across demographics, is represented through visuals and reviewed in a discussion. Chapter 5 also includes a discussion of study limitations.

- Chapter 5 provides a summary of the research question, contributions of the research, and future work in this research area.

## **Chapter 2**

### **Literature Review**

This chapter will discuss and describe campus crises, effective communication, and confirmation of information, including with whom people confirm information and where people go to confirm information.

#### **2.1 Campus Crises**

A college or university campus can be defined as the area in which the institution regulates. This encompasses the buildings, ground, and facilities of said institution and the students, faculty, and staff that work or attend the college or university. For this research, the definition of the campus extends to the information technology (IT) infrastructure and the people who are associated to the physical grounds of the institution. A crisis is an unexpected event, usually not forgotten, especially by the people involved (Ulmer et al, 2013). Crises often include a threat to something of value, with limited time to respond. Campus crises like the 2016 Ohio State University attack affect a large community (The Ohio State University, 2016). This attack was an intense and unexpected event that affected many people. The people touched by this campus crisis extended from those injured in the crisis to those who learned about the event through the media.

A campus community encompasses individuals who have had different experiences with emergency crises. Someone who has never been involved with an emergency crisis would react differently than someone who was the victim in previous emergency crisis situation (Drabek, 2012). Campuses vary in geographic location and are affected by some crises, like snow storms for example, more than other campuses would be. This also applies to institutions in large cities

where emergency responders have a more difficult task of securing a perimeter. Rural campus crises situations are easier to contain because perimeters are not hindered by large buildings and busy streets, however, there are fewer resources supporting crises.

Higher education institutions interact with their community through non-traditional media sources, like social media applications, websites, and online news. Non-traditional media has greatly impacted how emergency management departments send out critical information, such as the information on an emergency crisis occurring on campus (Junco et al., 2007). The overall evolution of technology has provided institutions with the ability to relay information to their community through online websites and social media. Preparing and planning for an emergency crisis now includes social media and other online websites in communication strategies for campuses (Paton et al, 2000; Jin et al, 2011).

A United States federal law established in 1990, known as the Clery Act, requires specific crime information to be relayed to campus students, faculty, and staff within a timely manner (Mastrodicasa, 2008). Many schools abide by the Clery Act by sending out text and email alert notifications to the entire campus. However, people in the campus community are not required to follow instructions in the alert. There is also limited authority to enforce people to obey the instructions, or in other words there is no person or consequence to campus communities for not following instructions from an alert. In a time-sensitive situation like an active shooter, the campus community is expected to make decisions immediately on their own as to whether or not they will follow the directions in the alert notification (Han et al., 2015; McKnight et al., 2002). According to a study by Han et al., some people decide to not follow alerts because they feel that the information is not going to pertain to them (2015). The Clery Act simply states that information must be relayed to campus students, faculty, and staff, however, there is no direction to enforce people to adhere to directions in the alert notification.

## 2.2 Effective Communication

Part of understanding the big picture for emergency responders during a crisis lies in the communication and connection between people involved and official responders. To be effective, the communication must be open and trusted, all within a short time frame. Having effective communication helps people comprehend their own situation, thus improving their decisions and reactions during a crisis (Reynolds & Quinn, 2008). Based off of the campus crisis definition mentioned earlier, effective crisis communication plays a key role in the time sensitivity (Ulmer et al, 2013) in regards to relaying information that reduces the overall harm to the community experiencing the crisis (Reynolds & Seeger, 2005). Summarizing effective crisis communication can be defined as a trusted message in an emergency, time sensitive situation that aims to provide fear and harm-reducing information to the public.

How to relay information to the public and receive information from the public in a crisis has changed. Traditional media outlets, like television, radio, and newspapers are no longer the only way that information can be spread to the public. Now, online media outlets like social media websites, blogs, and news forums have also been an efficient way to release information to the community, especially during a critical crisis situation (Schultz et al, 2011). If a great number of outlets are posting multiple messages, then individuals may submit to 'alert fatigue' and pay less attention to the messages. This would decrease overall communication and therefore would not be effective (Mastrodicasa, 2008).

New online media has left a gap in research, however. How university emergency management departments relay information to a mass number of people in a small community remains an important and current concern. This entails a community perception of information released and the overall community response (Schultz et al, 2011). Studies have focused on a wide spectrum of areas including how text messages from universities can be improved to which

medium is best preferred (traditional or online) when receiving information. The gap lies in concentrating on how effective specific traditional and online media outlets can be by studying the sources used to confirm notification alert messages.

Short response times for crises are needed, but are hard to prepare for (Ulmer et al, 2013). Fortunately, there are experts in this area. In fact, there is a high demand for knowledge and expertise in effective crisis communication. Government agencies and large corporations that respond to crises on a regular basis look for professionals with experience in effective crisis communication. These experts recognize what to do and what not to do in order to have effective crisis communication. Ulmer et al. notes that these subject matter experts do not focus on preset, or scripted, messages to send to the public (2013). Instead, they focus on listening to the public and understanding what their primary concerns are before sending out an official message regarding the situation. Then specific messages and instructions are sent out based on public concerns in regards to the severity of the crises (Reynolds & Seeger, 2005). All crises are unique and cannot be replicated, so creating a unique message and response is vital to effectively communicate a crisis situation (Ulmer et al, 2013).

Nonetheless, a few researchers disagree and point towards simplicity in a normality approach method. This method speaks mostly of how the public interprets the message that is being communicated about the crisis event. Questions here propose that everyone interprets the message differently and that 'effective communication' is biased (Coombs et al, 2011).

Stakeholders such as students, faculty, and staff of a college campus, for example, are more likely to respond to a crisis when the experts in the area take the time to listen to their needs. Similarly, meeting with the stakeholders can aid effective communication before a crisis happens. Although each crisis is unique, it is still important to know the audience should a crisis happen in a specific area, like a university campus. This can help with the response time from the

government agencies and corporations who are attempting to communicate with the public (Ulmer et al, 2013).

In a campus environment, communication encompasses groups of students that can be quite large, increasing the importance on effective communication that is effective (Ingle, 2002). In general, people are learning about events through online websites and social media applications (Endsley et al, 2014). Because students are increasing their use of social media, a university could use social media as a platform to communicate with students, inform students, and to acknowledge students' situational awareness during a crisis (Vieweg et al, 2010). The online media outlets in general have provided ample ways for a university to distribute information during a campus crisis. Contrastingly, this online technology has also provided university management departments with challenges (Mastrodicasa, 2008).

Current university students expect news to be delivered to them at a very fast rate. The current college generation has always had information available to them, especially about crisis situations, at their fingertips. However, this luxury has not always been effective for campus crisis situations. In 1998, servers at the University of Wyoming were overloaded with emails concerning the death of a student and caused the entire system to shut down. A year later in 1999, Texas A&M University had issues with telephone interceptions causing information to spread in an un-timely manner for students and families who were unable to quickly react to a bonfire spreading throughout campus (Rollo and Zdziarski, 2007; Mastrodicasa, 2008). The conclusions from these past incidents infers that online technology can also create challenges, such as unintended delayed responses to a crisis, which universities must be aware. However, these challenges could be overcome with effective communication skills and expertise.

A very popular method of communication to students, faculty, and staff in a university community is sending out a mass text-message alert. Several universities have noted that this technology has helped with arresting a gunman on campus and has guided students to safe

locations if needed (Mastrodicasa, 2008). The concern with this method of communication is their effectiveness. Typically, an emergency alert notification induces the feeling of fear in individuals. The alert usually gives a solution to help reduce the severity or stressful feeling of the overall situation and threat, too. Because this information is widespread, it gives the public a chance to respond and make a decision. Risk communication, which encompasses effective crisis communication, has grounded the idea that this method of creating a potential solution for the public facilitates that decision making process in hopes that the community will comply overall (Reynolds & Seeger, 2005).

Figure 2-1 below illustrates the results of a survey study conducted in 2009 that measured preferences for alert notifications from three Canadian Universities. Two of the three universities preferred a telephone call (voice message) to alternatives methods when dealing with an active

<b>Expressed Preferences (Percentages) for Alerting Methods for Unexpected Severe Weather and Active Shooter Incidents.</b>			
Unexpected severe weather (n=4486)	UA*	SFU*	UNB*
Telephone call (voice)	12	9	11
SMS/Text message	12	35	8
Email/instant messenger	34	43	67
Campus/other radio or TV	4	4	9
Siren/public address system	35	6	3
Word of mouth (face-to-face)	3	3	2
Active shooter on campus (n=4471)	UA	SFU	UNB
Telephone call (voice)	21	17	23
SMS/Text message	12	28	12
Email/instant messenger	17	11	14
Campus/other radio or TV	2	2	2
Siren/public address system	43	37	43
Word of mouth (face-to-face)	5	6	6
*Data shown are for University of Alberta (AB), Simon Fraser University (SFU), and University of New Brunswick (UNB).			

Figure 2-1: Preferred Alert Notification (Gow et al, 2009).

shooter on campus. Additionally, the study stated that the text message alert method should not be the only method used in warning the public about a crisis event on a campus.



Multiple methods should be used because of individual preferences and social behavior during a high stress situation (Gow et al, 2009).

### **2.3 Confirmation of Information**

Validity, in the context of open source media, is essentially how credible something is or in other words, it measures a “degree of confidence,” or trust (Whitehead, 1968). Online media outlets, especially social media applications and websites, are not considered the most trusted source of information (Tapia et al, 2011). Because of this, people tend to use more than a single piece of information to learn about one thing. For example, a text message alert that universities send out is likely to be confirmed with another message from an alternative communication source, like a different website or a television news channel (Gow et al, 2009). However, with the overwhelming amount of information the Internet and other media outlets distribute, it can be difficult for an individual to trust the amount of information that sources have (Drabek, 2012). This is important for crisis responders to understand which external sources, such as online media or television news, to use when relaying information. In addition, responders will be able to focus on favored media sources to ensure information is being shared as soon as possible.

#### **2.3.1 Who**

In the Han et al. 2015 study, the results illustrated that university officials and other superiorities, like parents, usually influenced individual’s trust more than friends. The study concluded that although friends who are in the area would seem to have a higher impact and understanding of the situation, they do not influence compliance with university alert notifications in crisis situations. Additionally, this study found that university officials have

greater influence during campus crises like an active shooter or robbery emergencies (Han et al, 2015). This study infers that people who have authority and respect in a university are more influential than personal contacts, such as friends and class peers.

Contradicting the Han 2015 study, another study indicated that instead of attempting to reach out to agencies or departments that issued the alert notification, individuals will reach out to friends and family. This is because reaching out to the alert issuer is normally a failure, meaning that response time from the communicator takes too long or does not happen at all (Drabek, 2012).

So how do people confirm, or trust, what they read online during a crisis communication? Here lies a gap in research. Online social media outlets have changed how information is spread and therefore how individuals can confirm the information founded in a crisis alert notification (Drabek, 2012). On a side note, it is important to remember that confirming information using additional sources can cause chaos by adding extra steps in such a time sensitive situation (Bucher, 2002). Understanding what sources are most trusted to confirm, or validate text message alerts, can help reduce the time to effectively communicate information during a crisis.

### **2.3.2 Types of Media**

The world is changing how people communicate with each other. Instead of face-to-face conversations and telephone calls, people are now posting information to websites where multiple people can interact with what is stated in a single post. This one-to-many method has changed the platform of communication, especially for emergency management departments (Qualman, 2010). Face-to-face interactions, like public speaking or speaking with one friend, do not happen with online communication, and therefore contribute to the feeling of uncertainty

when reading information on the Internet. Because the Internet and all of its media outlets, we have seen a lack in trust, or being able to confirm information, online (Bucher, 2002).

Downfalls of using online media in crisis communication situations include having limited information pertaining to the crisis (depending on which websites or other media outlets are used to validate the information), rumors, incorrect information, and opinionated articles or social media posts. All of the above ultimately deter the ability to confirm information online in general, let alone in a crisis. This also coincides with the previous literature review section, effective crisis communication, and the ability to call the online disseminated information effective (Bucher, 2002).

## **Chapter 3**

### **Research Question and Methodology**

The following chapter will list the two research questions, the two hypotheses for this research study, and the research methodology.

#### **3.1 Research Questions**

Two research questions were developed by the following scenario: given an emergency crisis scenario on a college campus, what media resources are used to confirm information, and how do they physically respond to the information?

1. Do students, faculty, and staff listen to instructions provided in emergency text alerts?
2. What external resources are students, faculty, and staff using to confirm that information is true in the alert notification?

#### **3.2 Hypotheses**

The hypotheses for this research question are as follows:

- H1: Personal contacts will be relied on more than official contacts to confirm information.
- H2: Social media will be used to validate information more than other external resources

### **3.3 Data Sample Population and Recruitment**

The research process began with semi-structured interviews with experts in emergency management and campus emergency management personnel. A survey was then distributed to a larger population.

#### **3.3.1 Semi-Structured Interviews**

Semi-structured interviews were used to help create survey questions. Four people were interviewed about emergency management and emergency management on campuses. Interviewees were chosen based on their academic background in emergency management, or their involvement in emergency management environments. Example questions from the interviews are as follows:

- What information does EM need to better crisis communication?
- Is there specific information that campus EM departments currently need to know for improving communication during a crisis?
- How does social media play a role in crisis communication?
- Are there specific resources or guidelines used during crisis communication?

Notes about the answers to the questions were recorded on pen and paper. From these questions, similarities across the four interviewees were used to create a survey. The notes were shredded after the survey was created. This process helped identify needs of emergency management, specifically to EM on campuses, and helped to develop a survey that would be distributed to a larger sample.

The IRB exemption letter can be found in Appendix A.

### 3.3.2 Survey

The online Qualtrics survey tool was used to develop the survey. Preliminary surveys were tested with a small sample of the intended population, which included a professor, one undergraduate student, and one graduate student. This initial survey helped determine the readability, the understanding, and the time it took to complete the survey. Results from this primary survey indicated that the survey was easy to understand, that the content was understood, and that the survey took under 5 minutes to complete.

The survey was distributed in the Fall 2016 semester to approximately 600 students, faculty, and staff of a rural mid-Atlantic university (The Pennsylvania State University located in State College, Pennsylvania). Second parties distributed the information via email. The email provided an explanation of the survey, the researcher, and a link to the survey. The survey was available for four weeks.

All surveys were submitted anonymously. Demographics included in the survey were race, gender, sex, and age. Participants had to be at least 18 years of age or older in order to take the survey. If the participant indicated he was under the age of 18 years old, the survey would end. If the participant indicated he was over the age of 18, the survey would proceed.

The survey focused on a hypothetical active shooter text message alert from the university's emergency management department. Participants read the hypothetical scenario and then answered questions about actions taken and external resources used for confirmation of information after receiving the emergency alert.

The IRB exemption letter can be found in Appendix B, and the survey can be found in Appendix C.

## Chapter 4

### Results and Discussion

The survey distributed to approximately 600 students, faculty, and staff and was completed by 468 eligible participants eighteen years of age or older. Participants were not required to answer every question. Respondents included White females, White males, Black/African American females, Black/African American males, Asian females, Asian males, and Indian/Alaskan Native males.

The following section will present and discuss the results of the distributed survey in three groups of analyses: participants' first action, personal contacts and university official sources, and current and preferred use of social media. Please refer to **Appendix C** for the survey questionnaire and **Appendix D** for demographic results from the surveys respondents.

#### 4.1 Analysis of Participants First Action

Figure 4-1 and Figure 4-2 on the next page illustrate a meaningful participant response to the first action they would take upon receiving an active shooter text alert from the university. Of the 457 responses for this question, 285 respondents (62.36%) said they would follow the instructions in the text message exactly. However, 125 respondents (27.35%) said they would leave the area and head elsewhere. Other responses includes ignoring the text and doing nothing (0.88%); asking other people around what to do (7%); and going inside but not following the additional instructions (2.41%).

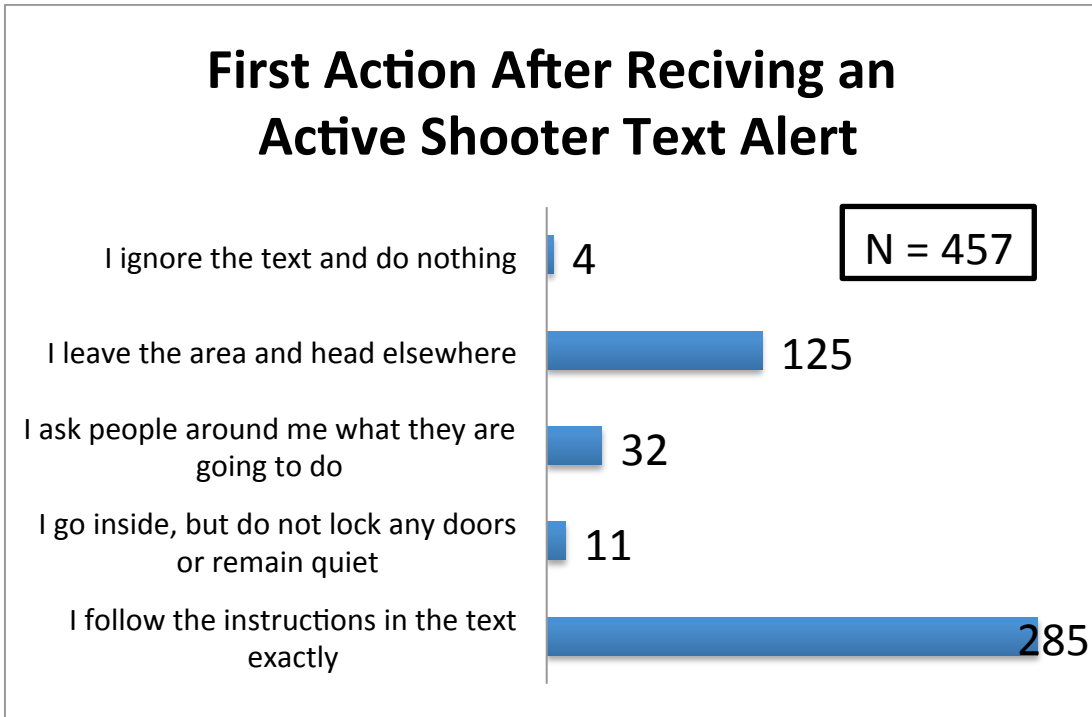


Figure 4-1: Respondents Answerers for First Action

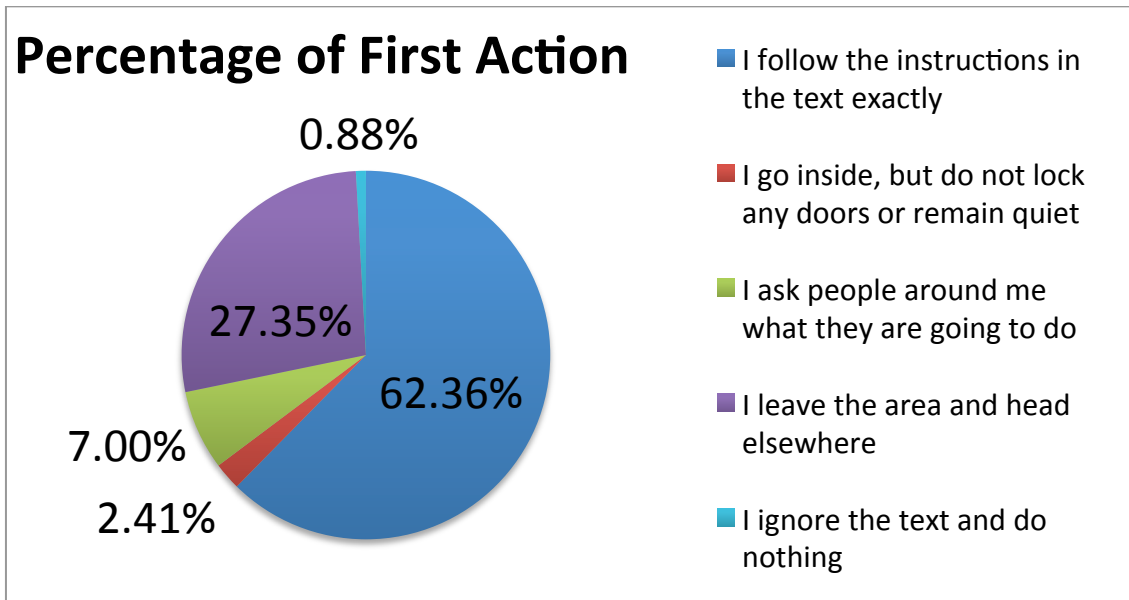


Figure 4-2: Respondents Answerers for First Action in Percentages



## 4.2 Analysis of Personal Contacts and Official University Sources

The following analyses look at the participant preferences between personal contacts and official university sources. For the following survey questions, personal contacts consisted of friends, family, classmates, and social media. Official university sources included university websites, the website link in the text alert notification, university faculty, university policy, and university dean's.

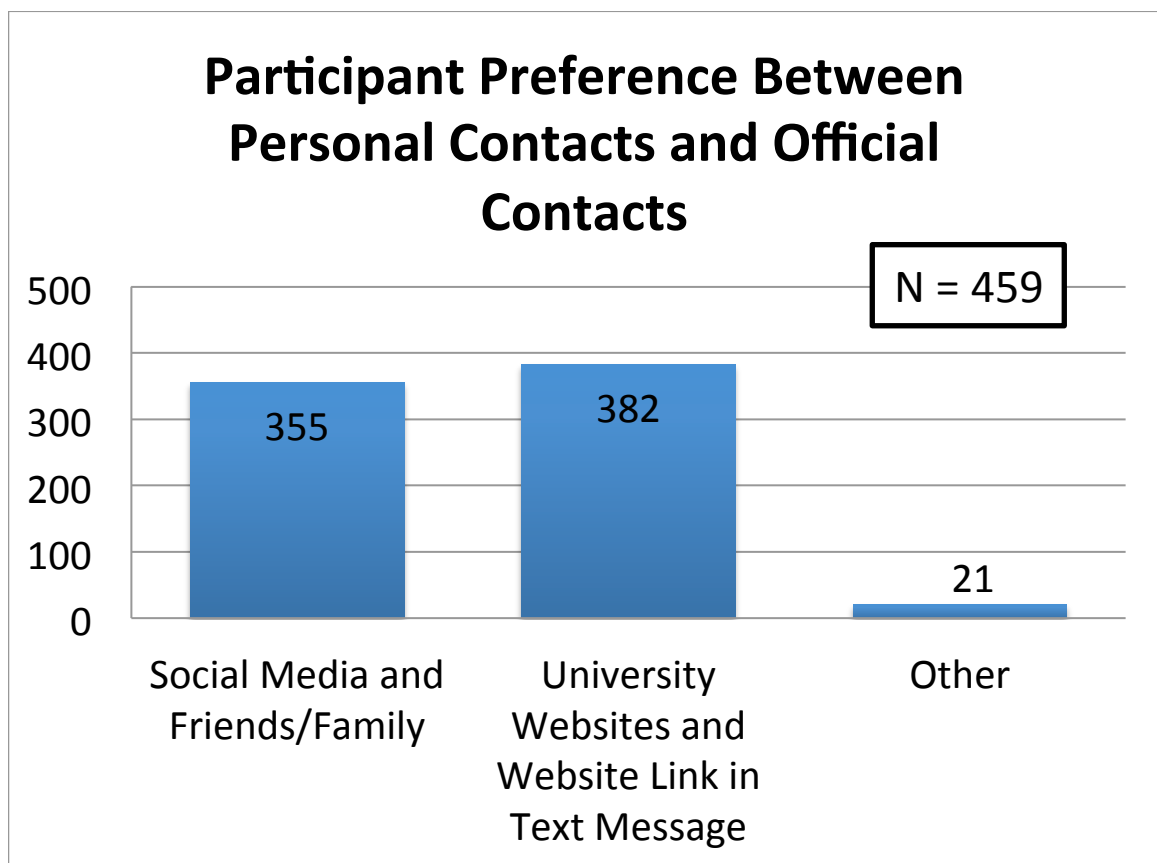


Figure 4-3: Respondents Preference Between Personal and Official Contacts

Participants were asked what resources helped confirm campus crisis alert information. Responses included 312 (68.12%) used social media, 251 (54.80%) relied on friends and family, 245 (53.49%) used university websites, 309 (67.47%) used the website link in the text alert, and 21 (4.59%) said other. When analyzing the “other” selection choice text responses, a majority of

them said the university alert text message system. However, other responses included the university emails and local news websites. Figure 4-4 on the previous page combined the personal contacts (social media and family/friends) and university official resources (university websites and website link in text messages). The results showed that 355 respondents use personal contacts, 382 respondents use official university contacts, and 21 respondents said other.

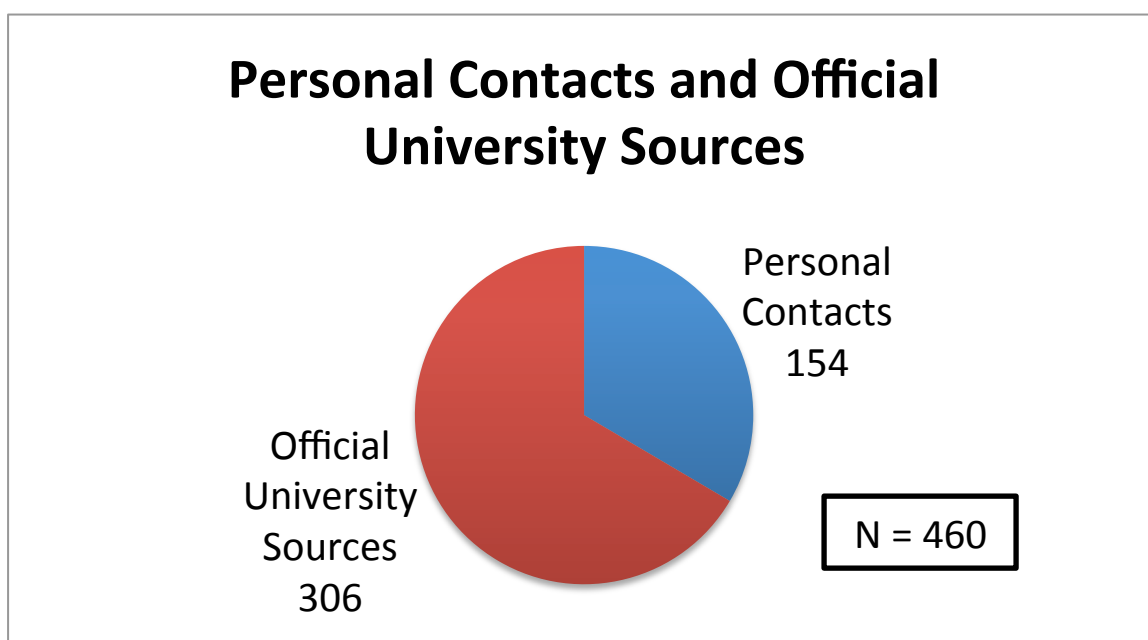


Figure 4-4: Respondents Preference Between Personal and Official Contacts

Participants were asked on whom they would more rely for social media information during a campus crisis. Of the 460 respondents, 306 (66.52%) chose official university sources and 154 (33.48%) chose personal contacts.

Participants were asked to select which person they would use as a resource during the hypothetical situation of an active shooter on campus. The top three choices in the five categories are as follows:

- Very Likely: police officer (265), friend (120), family member (85);
- Likely: friend (223), classmate (186); friends in clubs/organizations (172);

- Not Sure: classmate (141), Facebook friends (113), varsity coach (111);
- Not Likely: Facebook friends (113), family (89), university professor (88);
- Not Likely At All: varsity coach (146), Facebook friends (139), college dean (88).

Of the top six resources chosen for “Very Likely” (police officer, friend, and family member) and “Likely” (friend, classmate, and friends in clubs/organizations), only 1 (police officer) is considered an official contact. This data represents that participants are more likely to use personal contacts as a resource during a crisis, which contradicts the first analyses.

### **4.3 Analysis of Current and Preferred Social Media Usage**

The following analyses examine the social media usage and preferred alternative resource used to confirm, or validate, the information from the university text alert. These analyses concentrated on social media resources being used as an external resource, however, other methods of confirmation such as websites, news platforms, and people were also considered.

Figure 4-6 below illustrates 464 respondents social media usage. Facebook was used the most with 394 (84.91%) followed by Snapchat with 374 (80.60%). Other responses include Instagram with 335 (72.20%), Twitter with 231 (49.78%), and Other with 38 (8.19%). There were 13 (2.80%) respondents that chose none.

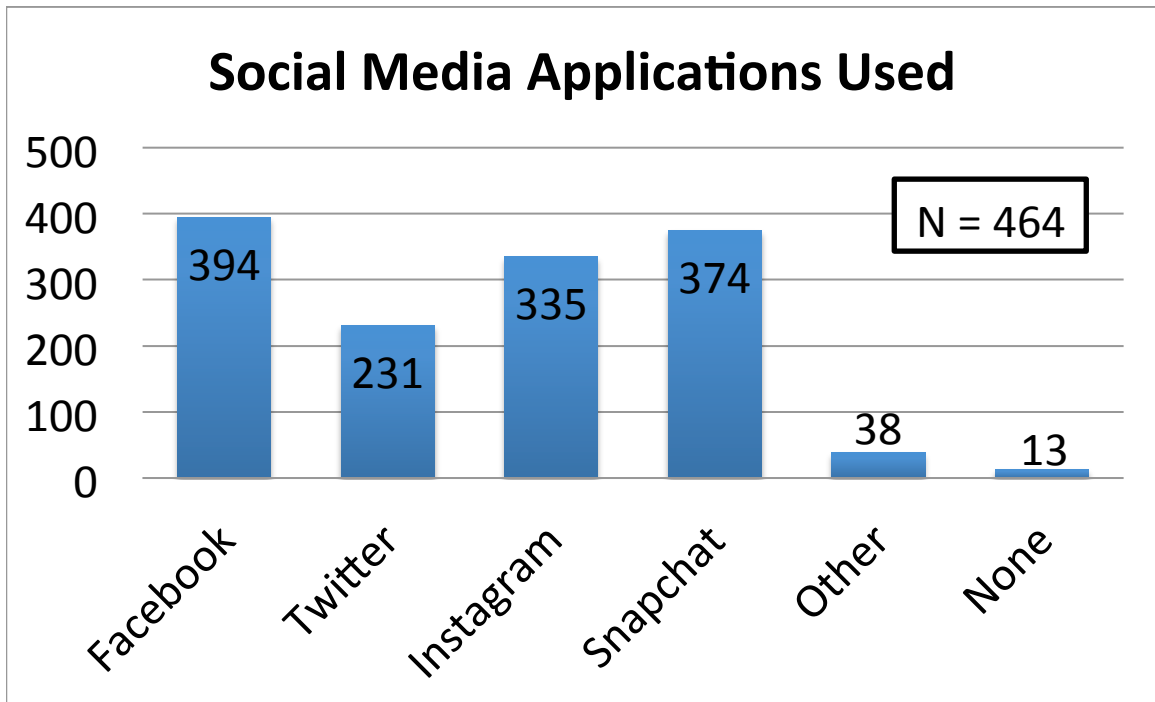


Figure 4-5: Respondents Social Media Application Use

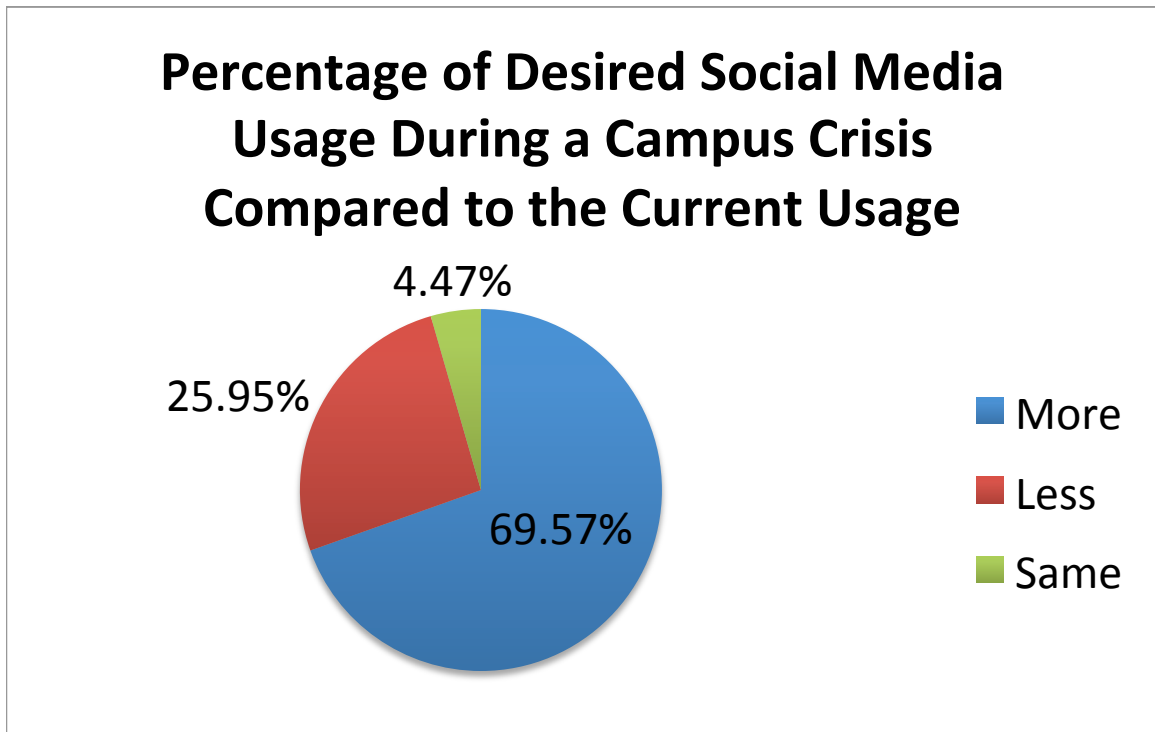


Figure 4-6: Respondents Desired Social Media Use From University Official Sources

Figure 4-7 above shows the desired social media usage from University Officials during a campus crisis compared to their current use. Of the 447 respondents, 311 (69.57%) said they would prefer university officials to use social media more during a campus crisis and 116 (25.95%) said they would have university officials use social media less than they currently do. A small number of participants said they would prefer university officials to use social media just as they are right now; 20 (4.47%).

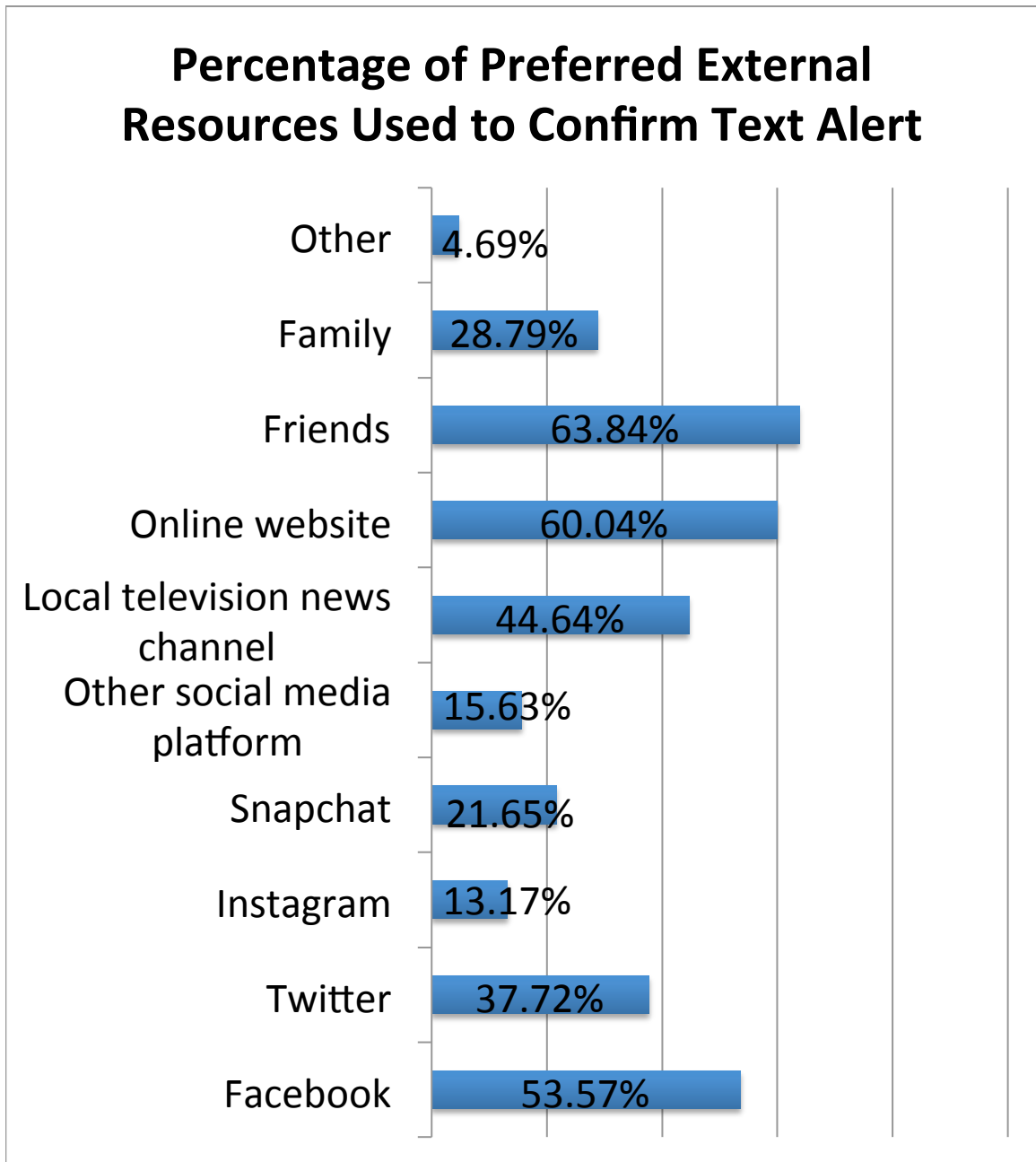


Figure 4-7: Participants External Confirmation Resources

Figure 4-8 above illustrates 448 respondents preferred external resources used to confirm the university text alert notification. Friends were the most preferred external resource with 286 respondents (63.84%), followed by an online website with 269 (60.04%) and Facebook with 240

(53.57%). The choice of other with 21 (4.69%), other social media platform with 70 (15.63%), and Instagram with 97 (21/65%) respondents were the least preferred external resource.

### 4.3 Limitations

The following describe the limitations of the research and study:

- The research was conducted at a large (40,000+ student), rural mid-Atlantic university. As such, the results can generalize to other large mid-Atlantic universities but not every university. For example, mid-Atlantic universities have crises, such as snowstorms, that southern universities might not experience as often.
- It is possible that the survey sample was not representative of all types of students, faculty, and staff at a mid-Atlantic university.
- A single researcher conducted the study. If more researchers participated in the research and research study process, then a more thorough and generalizable research methodology could have been provided.
- Bias from the semi-structured interviews could have developed a biased survey. The researcher attempted to eliminate this bias by conducting multiple interviews, however, some bias may remain present in the creation of the survey in regards to the needs of emergency management.
- The researcher had a time limitation in completing the research due to graduation requirements.

## **4.4 Conclusions and Implications**

The following sub-sections summarize and discuss the implications of the findings. These sub-sections are broken up into the participants' first action, personal contacts and university official sources, and current and preferred use of social media.

### **4.4.1 Participants' First Action**

The majority of respondents said that they would follow the instructions in the text alert exactly. However, 125 respondents said that they would head elsewhere instead of following instructions. Overall, there were 172 out of 457 respondents (about 38%) that did not select "I would follow the instructions in the text message exactly". This implies a major issue for the emergency management because there are 172 people not following the text alert instructions, and is therefore ineffective. The 125 people that said they would leave the area creates an additional challenge for emergency management because these individuals, without exact knowledge of where the shooter is, may become targets.

### **4.4.2 Personal Contacts and University Official Sources**

The results show that when respondents were asked upon whom they prefer to rely for information, official university sources were preferred. However, when respondents were asked to pick amongst different categories of people, there was a mixture of both official and personal contacts that were preferred. In this case, university police officers, university professors, university or college deans, and varsity coaches were categorized as official university sources. Friends, family members, classmates, Facebook friends, and friends in clubs/organizations were categorized as personal sources. The most likely used source in the hypothetical campus crisis of



an active shooter was a university police officer. However, the two of the least likely personal to be used are varsity coaches and college deans. Friends and family were placed in the very likely category with the police officer. This implies that there may be specific university related people that respondents feel can help, and other university sources that do not appear helpful.

From these results, it is recommended that emergency management focus on relaying information from personal contact sources. For example, using student run news-papers and communicating with the students on the staff of those newspapers might be able to help spread the word about events and information more effectively to the students of a university. Another solution could be to ensure that official university sources continue to work on relaying information with students, faculty, and staff in a timely matter in regards to the crisis.

The second hypothesis, personal contacts will be relied on more than official contacts to confirm information, was rejected. However, there could be further research to determine what types of official university sources students, faculty, and staff will rely on for information compared to others.

#### **4.4.3 Current and Preferred Use of Social Media**

The results show that respondents use Facebook (53.57%), Snapchat (21.65%), and Instagram (13.17%) the most. As Snapchat and Instagram are mostly pictures, it can be assumed that not as much text information is shared through those two social media outlets. Facebook, however, is known to provide and link news articles to learn more about a particular incident. When asked what external resource (compared to just the text alert notification) that respondents preferred to use to confirm information, most answered with friends, online websites, and Facebook. Facebook, friends (who might also be on Facebook) and links to online news articles through Facebook appear to be the most preferred method to confirm the text alert notification.

Instagram and Snapchat were the least preferred external resource, possibly due to the nature of the application intent to not contain text information itself.

When bluntly asked how much university official sources social media should be used during a campus crisis compared to the current use, a majority of respondents (69.57%) chose that it should be used more. Although 25.95% said it should be used less, and 4.47 % said the same amount.

There was a low number of participants who chose other for the social media applications used and preferred external resource, which means that a majority of what respondents use was listed in this survey and can help emergency management departments focus on particular social media applications.

Hypothesis two was rejected. There was no evidence that social media was used more than other media outlets. In fact, local television news (44.64%) was preferred as an external resource over Twitter (37.72%), Instagram (13.17%), Snapchat (21.65%), and other social media platforms (15.63%). Facebook (53.57%) was still preferred over local television news (44.64%), though, and should still be considered as a valuable resource for emergency management.

## **Chapter 5**

### **Conclusion**

This research contributes to knowledge regarding validity and confirmation needed to improve text alert messaging. The initial focus is on crises events on large university and college campus settings in the United States. However, this research could be extended to influence study in other mass-gathering events around the world.

Understanding how campus and university communities respond to an emergency crisis can help EM develop new strategies or technologies for communicating information to the people

who need it most. Furthermore, considering the need for confirmation of information from an emergency alert is important to ensure that the most trusted individuals on a campus event are sharing information as soon as possible. This is important in campus settings, but also in settings where many people are together, like a sporting event or a political event.

This research is focused on effective text alert communication, particularly with social media, and how this developing technology can play a vital role in emergency management. Understanding where people go to confirm information from an emergency alert can help emergency responders understand how to prioritize where information is disseminated. Additionally, whom people confirm information with is also important for EM. This helps EM know which people to be in contact with, send specific information to, and possibly turn to for help in the event of a campus crisis.

The following sections will conclude the research study with a short summary of the research question, hypotheses, and study contribution. Additionally, a short discussion of future work has been included as well.

### **5.1 Research Question, Hypotheses, and Contributions**

There were two research questions for this study:

1. Do students, faculty, and staff listen to instructions provided in emergency text alerts?
2. What external resources are students, faculty, and staff using to confirm that information is true in the alert notification?

The two research questions were supported by two hypotheses:

- H1: Personal contacts will be relied on more than official contacts to confirm information.

- H2: Social media will be used to validate information more than other external resources.

Both hypotheses for this research study were rejected, however, valuable information was learned for emergency management departments at universities. A large percentage of the sample responded to the survey saying that they would not follow the text message alert instructions. This is important for emergency management departments to know should a situation like an active shooter occur on campus. Alternative containment mechanisms might be needed to persuade students, faculty, and staff to follow the instructions in the text exactly.

University officials are preferred as external resources on social media to confirm text message alert information. This is important for emergency management departments so they can leverage university officials to use social media to post about crises if one occurred on campus. Additionally, knowing that Facebook, Instagram, and Snapchat have the highest use of social media applications can help EM know to use those applications and focus on relaying important information through those social media outlets.

This research also provided a foundation for emergency management to understand which social media outlets were used and preferred. This is important to not over-do social media use, which could cause people to ignore these important messages. Using these applications should be used for extremely important notifications, and students, faculty, and staff should be aware of that.

## **5.2 Future Work**

This research is the beginning of studying how text message alert notifications can be more effective for students, faculty, and staff at college universities. There is additional research

that can be conducted to help determine how effective text message alerts are, and how to improve these communication efforts.

Creating a simulation for the scenario, and allowing students to use external resources to confirm that the information is true could provide a more real-life situation for participants that could provide different results. Also, testing potential message styles for the alert notification could be useful for getting more participants to follow the instructions in the alert notifications. This could include altering who the notification message comes from, adding links to specific confirmation sources, using phone calls, or simply changing the layout of text messages and emails to include images or videos from university official sources.

Research can extend into specifics on social media use. It would be helpful to be able to determine which sources within specific social media outlets, are used to confirm information. In this study, Facebook was used more than other social media outlets to confirm information, but understanding why would be helpful for Emergency Management departments. This could potentially be because of Facebook is more of a closed network, meaning people add each other as friends. Twitter is an open network where information can be viewed from many sources, and could therefore equate to being not as reliable.

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## Appendix A

### Semi-Structured Interview IRB Exemption

The following screenshot shows the exemption IRB for the semi-structured interviews.

PENNSSTATE

	<b>IRB Program</b> Office for Research Protections	Vice President for Research The Pennsylvania State University 205 The 330 Building University Park, PA 16802	Phone : (814) 865-1775 Fax: (814) 863-8699 Email : <a href="mailto:grprotections@psu.edu">grprotections@psu.edu</a> Web : <a href="http://www.research.psu.edu/hrp">www.research.psu.edu/hrp</a>
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#### EXEMPTION DETERMINATION

**Date:** October 27, 2016  
**From:** Stephanie Krout, IRB Analyst  
**To:** Lauren Anderson

Type of Submission:	Initial Study
Title of Study:	The Expert's Outlook: Emergency Management Communication
Principal Investigator:	Lauren Anderson
Study ID:	STUDY00006073
Submission ID:	STUDY00006073
Funding:	Not Applicable
Documents Approved:	<ul style="list-style-type: none"> <li>• Emergency Management Interviews (3), Category: IRB Protocol</li> <li>• Interview Questions (1), Category: Data Collection Instrument</li> </ul>

The Office for Research Protections determined that the proposed activity, as described in the above-referenced submission, does not require formal IRB review because the research met the criteria for exempt research according to the policies of this institution and the provisions of applicable federal regulations.

Continuing Progress Reports are **not** required for exempt research. Record of this research determined to be exempt will be maintained for five years from the date of this notification. If your research will continue beyond five years, please contact the Office for Research Protections closer to the determination end date.

Changes to exempt research only need to be submitted to the Office for Research Protections in limited circumstances described in the below-referenced Investigator Manual. If changes are being considered and there are questions about whether IRB review is needed, please contact the Office for Research Protections.

Penn State researchers are required to follow the requirements listed in the Investigator Manual ([HRP-103](#)), which can be found by navigating to the IRB Library within CATS IRB (<http://irb.psu.edu>).

This correspondence should be maintained with your records.

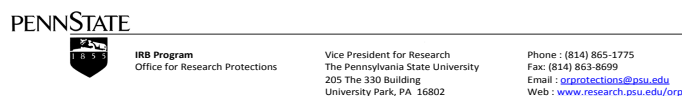
ID00000027

Figure A-1: Participant Gender.

## Appendix B

### Survey IRB Exemption

The following appendix is a screenshot of the exemption from the Penn State IRB office for the survey that was distributed to students, faculty, and staff.



#### EXEMPTION DETERMINATION

**Date:** October 27, 2016

**From:** Stephanie Krout, IRB Analyst

**To:** Lauren Anderson

Type of Submission:	Initial Study
Title of Study:	Campus Crisis and Communication: Validation and Resources
Principal Investigator:	Lauren Anderson
Study ID:	STUDY00006074
Submission ID:	STUDY00006074
Funding:	Not Applicable
Documents Approved:	<ul style="list-style-type: none"> <li>• Anderson_Thesis (3), Category: IRB Protocol</li> <li>• Thesis Study - Anderson (2), Category: Data Collection Instrument</li> </ul>

The Office for Research Protections determined that the proposed activity, as described in the above-referenced submission, does not require formal IRB review because the research met the criteria for exempt research according to the policies of this institution and the provisions of applicable federal regulations.

Continuing Progress Reports are **not** required for exempt research. Record of this research determined to be exempt will be maintained for five years from the date of this notification. If your research will continue beyond five years, please contact the Office for Research Protections closer to the determination end date.

Changes to exempt research only need to be submitted to the Office for Research Protections in limited circumstances described in the below-referenced Investigator Manual. If changes are being considered and there are questions about whether IRB review is needed, please contact the Office for Research Protections.

Penn State researchers are required to follow the requirements listed in the Investigator Manual ([HRP-103](#)), which can be found by navigating to the IRB Library within CATS IRB (<http://irb.psu.edu>).

This correspondence should be maintained with your records.

ID00000027

Figure B-1: Survey IRB Exemption

## Appendix C

### Survey Questionnaire and Consent Form

The following appendix is the Qualtrics survey that was distributed to students, faculty, and staff. This survey was ultimately designed based off the needs of the emergency management personnel.

Q1 This research study, titled Campus Crisis, is being conducted by Lauren Anderson, a Penn State Master's student in the College of Information Sciences and Technology. The purpose of this study is to understand how a university community responds to crisis information sent by the university emergency management department. You will be asked to complete a survey by answering questions relating to a campus crisis alert notification. This study involves research for a Master's degree thesis. Participation in this survey is strictly voluntary. No personally-identifiable information is being collected. Your answers to the survey questions will remain confidential. You may choose to not answer questions, and end the survey at any time without penalty. If you have any questions or concerns about this survey, you can email [lca5073@psu.edu](mailto:lca5073@psu.edu) or [eglantz@ist.psu.edu](mailto:eglantz@ist.psu.edu). If you have questions regarding your rights as a research subject or concerns regarding your privacy, you may contact the Office for Research Protections at 814-865-1775. To participate in this survey, you must be 18 years of age or older and agree to take this survey voluntarily. Are you at least 18 years of age and agree to participate?

- Yes
- No

Q2 What is your gender:

- Male
- Female
- Other

Q3 Which group do you most identify?

- American Indian/Alaska Native
- Asian
- Black or African American
- Native Hawaiian or other Pacific Islander
- White
- Other

Q4 Please enter your age:

Q5 Please indicate your affiliation with Penn State:

- Undergraduate Student
- Graduate Student
- Faculty
- Staff/Tech Service

Q6 Which clubs and/or organizations are you involved with at Penn State?

- Greek Fraternities/Sororities
- Club or intramural Sports
- Varsity Sports
- HUB/Student Activities
- Other \_\_\_\_\_
- None

Q7 What social media applications do you use? (Check all that apply)

- Facebook
- Twitter
- Instagram
- Snapchat
- Other \_\_\_\_\_
- None

Q8 Who would you rely on more for social media information during a campus crisis?

- Official university sources (university faculty, university police, university dean's, etc.)
- Personal contacts (friends, family, classmates, etc.)

Q9 What resources help you confirm campus crisis alert information? (Select all that apply)

- Social Media (Facebook, Twitter, Instagram, Snapchat, etc.)
- Friends and family
- University websites
- The website link in the University Alert message
- Other \_\_\_\_\_

Q00 Please use the following scenario to answer the survey questions: You are in the Pollock Halls courtyard. A Penn State text message alert was issued with the following information: 01PSUAlert01: Person w/gun near Pollock Halls. Seek shelter. Secure doors. Be silent. Be still. Authorities responding.

Q10 You are in the Pollock Halls courtyard. A Penn State text message alert was issued with the following information: 01PSUAlert01: Person w/gun near Pollock Halls. Seek shelter.

Secure doors. Be silent. Be still. Authorities responding. What action do you take first?

- I follow the instructions in the text exactly
- I go inside, but do not lock any doors or remain quiet
- I ask people around me what they are going to do
- I leave the area and head elsewhere
- I ignore the text and do nothing

Q11 You are in the Pollock Halls courtyard. A Penn State text message alert was issued with the following information: 01PSUAlert01: Person w/gun near Pollock Halls. Seek shelter. Secure doors. Be silent. Be still. Authorities responding. Using the scale provided, please select how likely you are to use the following person as a resource during above scenario:

	Not Likely at all	Not likely	Not sure	Likely	Very Likely
University	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Police Officer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Friend	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
University	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Professor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Family	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
member	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Classmate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
University -	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
College Dean	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Varsity	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Coach	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Facebook	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
friends	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Friends in	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Clubs/Organizations					
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Q12 You are in the Pollock Halls courtyard. A Penn State text message alert was issued with the following information: 01PSUAlert01: Person w/gun near Pollock Halls. Seek shelter. Secure doors. Be silent. Be still. Authorities responding. What external resource do you use to confirm the information in the text message is correct? (Check all that apply)

- Facebook
- Twitter
- Instagram
- Snapchat
- Other social media platform
- Local television news channel
- Online Website (Blog, news website)
- Friends
- Family
- Other \_\_\_\_\_

Q13 How informed are students since official university representatives have started using social media during campus crisis situations?

- Very informed
- Informed
- Somewhat informed
- Not informed at all



Q14 Do you think social media should be used more or less with students during campus crisis situations?

- More
- Same
- Less

## Appendix D

### Demographic Results from Survey

The following appendix includes results from demographic analyses of the survey participants.

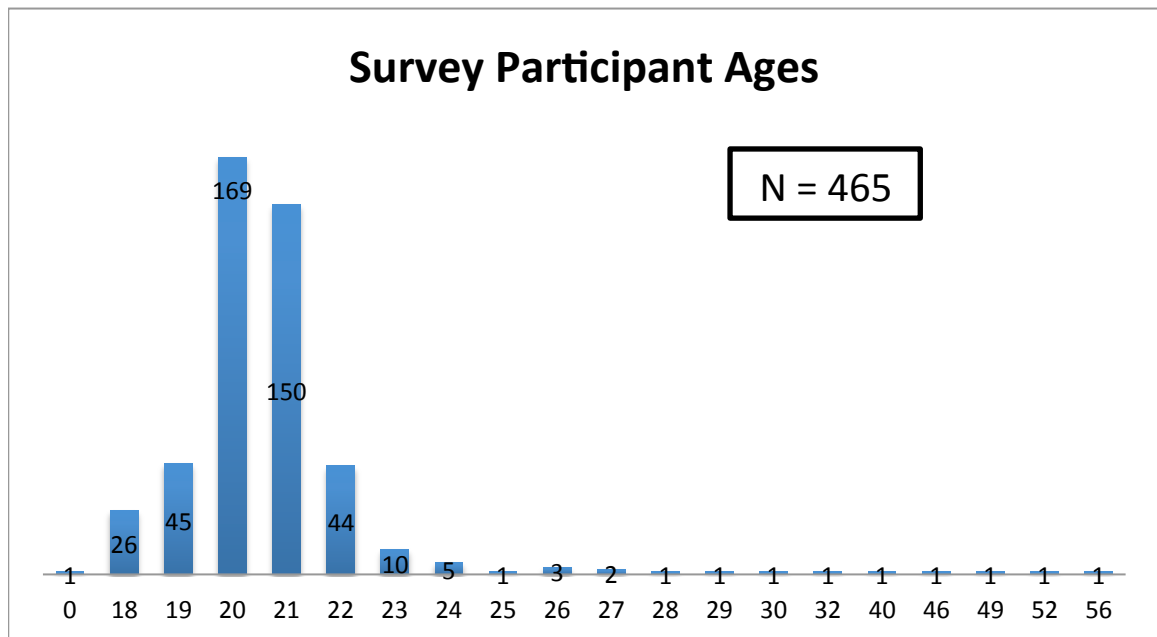


Figure D-1: Survey Participant Ages.

The age range for the survey participation was 18 to 56. One participant typed 0 for age. This was most likely incorrect due to the consent form at the beginning of the survey. There were 3 participants who did not answer this question. Figure D-1 illustrates the respondents to this question.

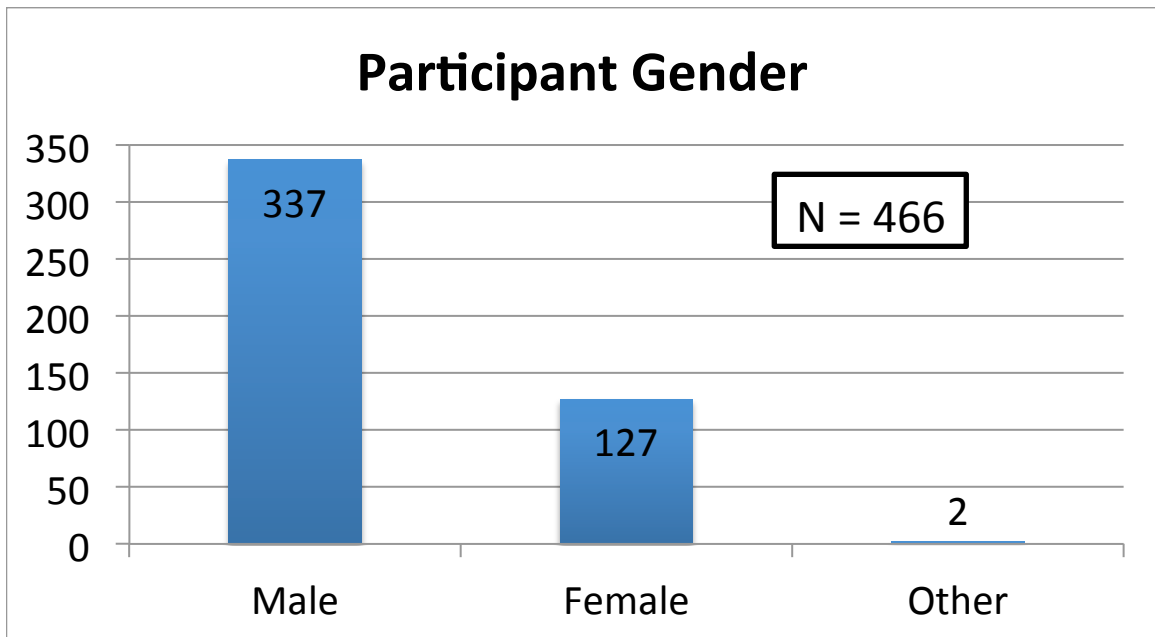


Figure D-2: Participant Gender.

Figure D-2 above results show that there were 337 males, 127 females, and 2 others in the survey. There were 2 people who did not answer this question.

Figure D-3 on the next page illustrates the group that participants identified themselves with. There were 3 American Indians/Alaskan Natives, 78 Asians, 20 Black/African Americans, 346 White, and 18 other. There were no people that identified as a Native Hawaiian or other Pacific Islander. This group was therefore not included in the analyses.

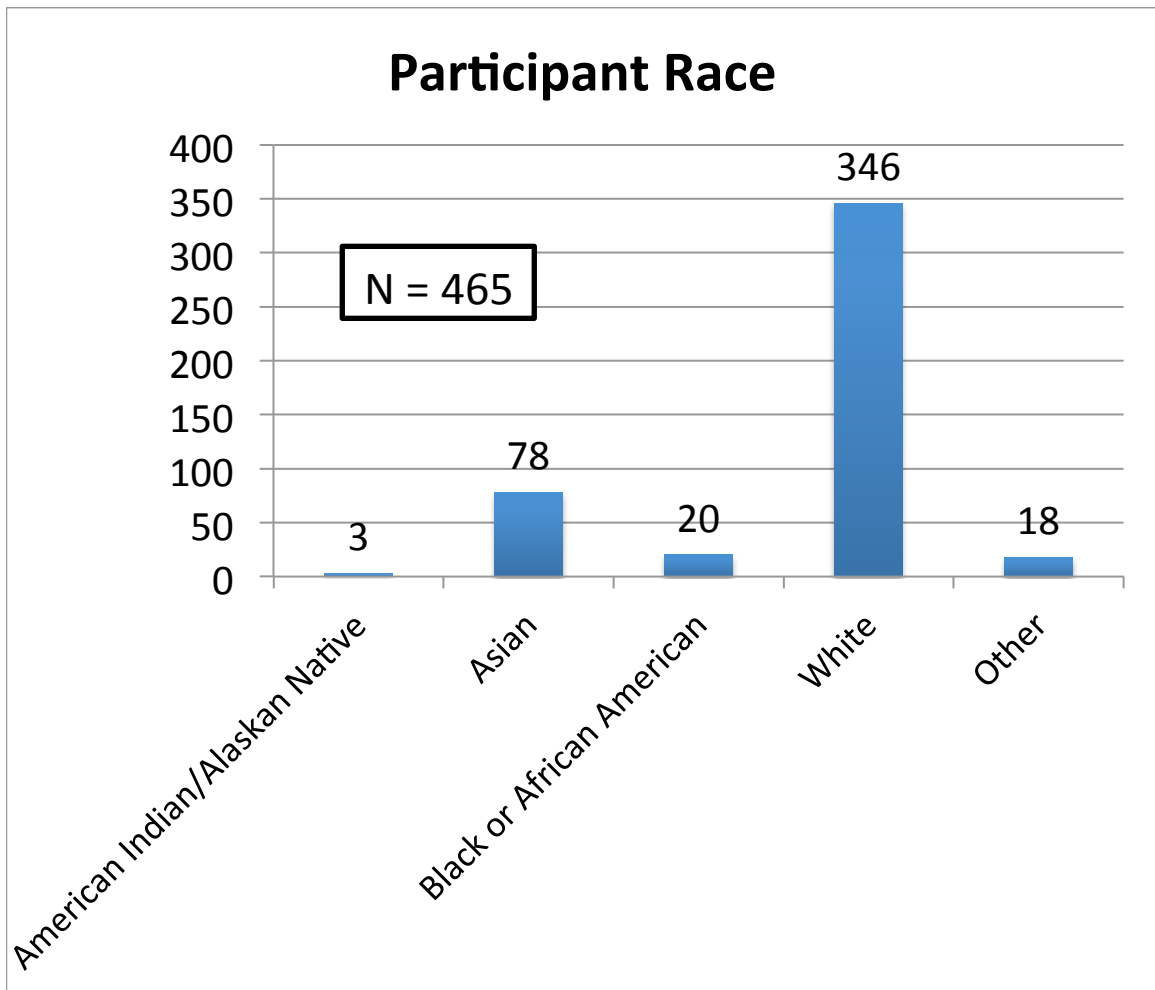


Figure D-3: Participant Race.

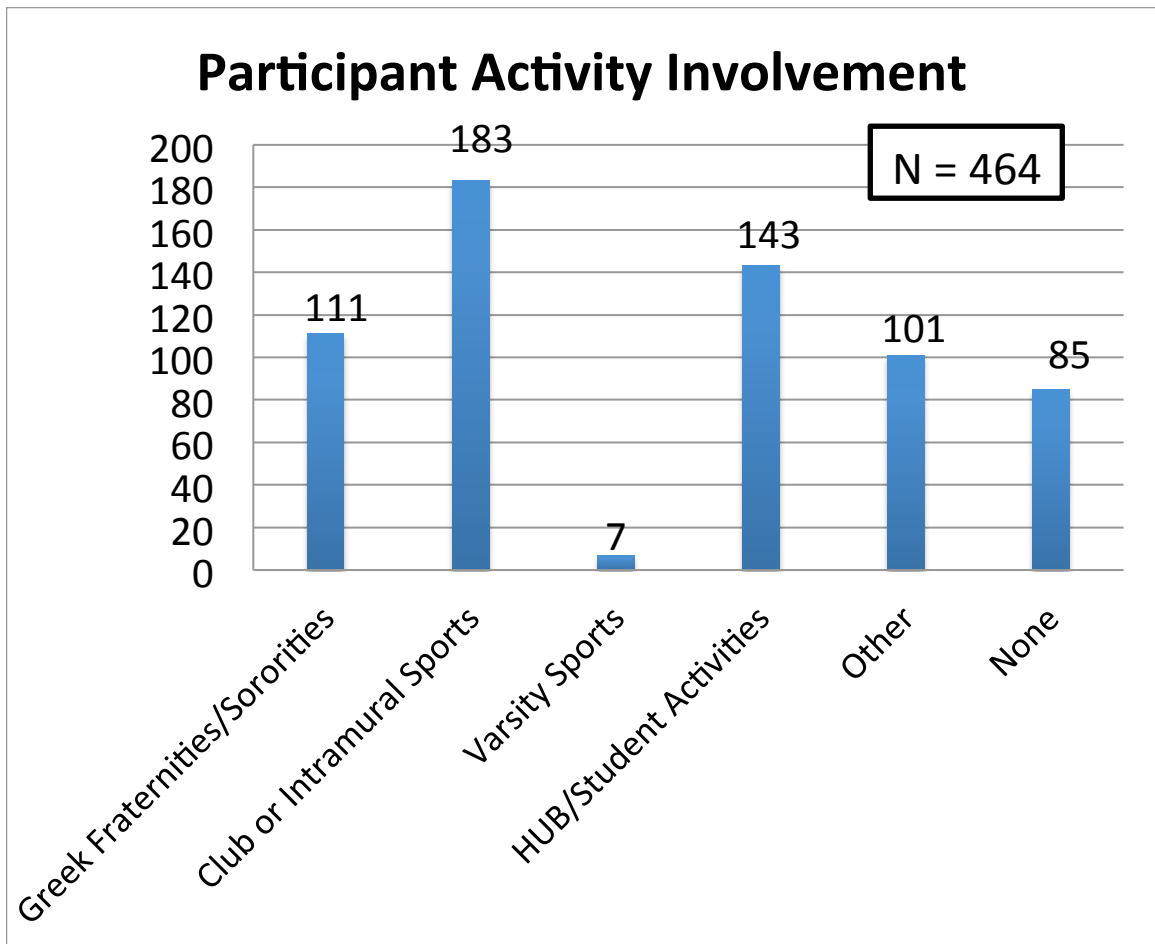


Figure D-4: Participant Activity Involvement.

Figure D-4 represents the respondents' activity involvement on campus. Respondents indicated being apart of the following: 111 (23.92%) Greek fraternities/sororities 111; 283 (39.44%) club or intramural sports; 7 (1.51%) varsity sports; 143 (30.82%) HUB/student activities; 101 (21.77%) other; and 85 (18.32%) none.

Participants included the following responses under "other": THON, Business fraternity, college club, Alumni association, Christian ministry, Hillel, ROTC, student government, learning assistant program, Newman catholic club, special living options, ResCom, Honors College, and PSU Blue Band.

## Appendix E

### Academic Vita

#### ACADEMIC VITA

**Lauren Anderson**

19laurenc@gmail.com

---

#### Education

Master of Science in Information Sciences and Technology

Thesis: Effective Text Communication During a Campus Crisis

Thesis Advisor: Edward J. Glantz

Bachelor of Science in Security and Risk Analysis

Concentration in Information Cyber Security

Minor in Arabic

#### Work Experience

Learning Assistant/Teaching Assistant for SRA311                      Fall 2015-Fall 2016

The Pennsylvania State University in the College of IST

Dr. Edward J. Glantz

Undergraduate Researcher/Intelligence Analyst

Spring 2015

Applied Research Lab at Penn State University

John Hodgson, Julia Erdley

Business Systems Analyst

Summer 2014

PNC Bank in Pittsburgh, Pennsylvania

Laurel Weinberg

#### Certifications:

CompTIA Security+ SY0-401

March 2016

#### Activities:

Pasquerilla Spiritual Center, Eucharistic Minister

2015 – Present

Penn State THON

2012-Present