Diversity and Danger: Risk Communication in the Heartland

Desiree Newhart Hill
Anna Kochigina
Md. Nazmul Kabir Rony
University of Oklahoma
Abstract
College students and university communicators intersect in important ways during times of intense crisis. Diverse population groups, a need for risk communication, and technology dependencies come together before, during, and after disasters occur. This quantitative research project seeks to learn how international and out-of-state students on a middle-American college campus understand safety procedures for a variety of potential emergencies such as tornadoes and campus shootings. Risk communication, crisis communication, crisis responsibility, the protection action decision model, and the three-challenge approach are analyzed in conjunction with the research findings. The concepts of risk communication, diverse populations, and technology dependencies are explored to create new understandings for university risk communicators in the creation of successful disaster planning models for diverse groups of stakeholders on university campuses across the U.S.

Keywords: crisis communication, risk communication, diversity, technology
Diversity and Danger: Risk Communication in the Heartland

College campuses are communities where a priority is placed on education with safety a component of unencumbered learning. Yet, the illusion of safety can be quickly shattered. The deadliest campus shooting in United States history occurred in 2007 on the Virginia Tech campus. A student shot and killed 32 students and faculty; among the dead were five international students (Virginia Tech Review Panel, 2007) with the number of U.S. campus shootings steadily increasing (Kaminski, Koons-Witt, Thompson, & Weiss, 2010).

Successful risk communication during times of extreme emergency can mean the difference between life and death. At its most basic, risk communication involves message dissemination to appropriate audiences. Complicating risk communication on college campuses is the extreme diversity of individuals.

Little or no research has been conducted on how to communicate better with diverse groups of students during disaster situations. Students are a distinctive population in the sense that they are transitory, slightly aware of their vulnerabilities, and do very little to prepare for disasters (Lovekamp & Tate, 2008). Additionally, young adults use technology in unique and varied ways, adding further communication complexities to risk situations. A Pew study (2011) found young adults to be the most avid texters compared to other demographic groups, sending an average of 3200 texts per month. The same study found that 31% of respondents overall preferred texting to voice calls.

Scholars have identified “communication” as a major portion of disaster preparedness (Kailes & Enders, 2007). Individuals do not receive and respond to communication messages in the same way. Some population groups have limitations that
hinder their receipt and response to information. Included in this population are people such as international students who are ethnically diverse and those with limited or no ability to speak, read, or understand English (Kailes & Enders).

Diverse groups, risk communication and technology use combine to create specific needs and opportunities for communication regarding international students on college campuses. This research project adds to the limited scholarship that exists regarding risk communication, international student populations, and disaster preparedness. This study seeks to understand how prepared students are for potential crises and the ways in which students most want to receive communication during emergencies when they are in the classroom. Finally, this study provides recommendations to university communication practitioners on how to best prepare students for campus emergencies.

**Literature Review**

**Risk Communication**

The broad definition of risk encompasses negative effects to people and/or property resulting from events such as weather crises, disease outbreaks, manmade disasters, and other events (Lindell, Prater & Perry, 2006). Risk communication is rooted in the communication model advanced by Shannon (1948). In this model the source communicates a message through a channel to a receiver (Verdu, 1998). Research from this model has found sources are perceived predominantly in terms of expertise and trustworthiness (Lindell et al., 2006; Lundren & McMakin, 2009). Other components need to be taken into consideration in risk communication, such as the understanding of the receivers and the perceptions of the messages once they are received (Lundren & McMakin). Risk communication can induce disaster responses for immediate threats, such
as evacuations or sheltering-in-place (Lindell et al., 2006), but the simplistic idea that
communication can be achieved with the dissemination of information in the event of a
natural disaster can be misleading, as differences among individuals may not be taken into
account (Lindell et al.).

**Crisis communication.** Crisis communication has long been at the center of public relations research (Grunig, 2006). Crisis responsibility is “the degree to which stakeholders attribute responsibility for a crises to an organization” (Coombs, 2004, p. 268). When crisis responsibility is strong, the threat to the organizational reputation is larger. Coombs identified three causal dimensions people use to make crisis attributions: stability (frequency of crisis), external control (controllability of crisis), and personal control/locus (controllability of crisis by actor). Coombs found that organizational crisis responsibility should be perceived as strongest when the cause is stable (the organization has a history of crises), external control is low (controlled by others outside of the organization), and personal control/locus is internal (the crisis originates from within the organization). When a person perceives that the organization is responsible for the crisis, the organization’s reputation is under a great threat.

extreme, sudden danger—an accident at an industrial plant, the impending break in an earthen dam, or the outbreak of a deadly disease” (Lundren & McMakin, 2009, p. 4).

Universities are organizations with a responsibility to the many publics they serve, most especially vulnerable student populations. Universities are "Public organizations (that) have a mandate to serve the public interest and secure the safety of citizens (students) by managing crises effectively” (Palttala & Vos, 2011, p. 316).

The main goal of crisis management is to protect stakeholders from harm. The secondary goals are to protect reputational and financial assets (Coombs, 2009). Crisis management is composed of two related communication processes: (1) crisis knowledge management and (2) stakeholder reaction management (Coombs). Coombs also argued that crises create a demand for “knowledge,” which is the need for “information.”

The literature suggests that a clear plan or model of communication is important before, during, and after a crisis. For the purposes of this study, the university is the crisis management authority, and students represent one group of its stakeholders. University authorities should have a master plan of crisis communication based on information they have accumulated for and from their stakeholders.

**Three-challenge approach.** Several risk communication models and theories exist which relate to crisis communication. The three-challenge approach outlined by Rowan (1991) is the framework used for this analysis. Knowledge, process, and communication skills are the three challenge areas covered by this approach. Knowledge challenge refers to the need for audiences to understand risk communication. Process challenge is the need for audiences to be involved in the risk communication process. The communication skills challenge means audience members need to be able to understand the information they
receive (Lundren & McMakin, 2009). The three-challenge approach takes into
consideration the need for both the communicator and the audience to have “excellent
communication skills” (Lundren & McMakin, p. 16). If the audience's communication skills
are weak, then the risk communicator will need to find ways to compensate in order to
increase understanding (Lundren & McMakin).

Successful communication in the three-challenge approach includes presenting
information in a variety of ways, using visual elements (such as graphics and diagrams),
including face-to-face communication, and technologically-assisted communication (such
as websites and mobile phones) (Lundren & McMakin, 2009). Audience participation is also
a significant component of the three-challenge approach. Lundren and McMakin wrote, “the
audience may be involved by helping to develop emergency preparedness plans” (p. 16).
The Disaster Resistant University initiative described by Human, Palit, and Simpson (2006)
advocated a stakeholder meeting process, which can yield creative results to bolster safety
efforts (such as the need for satellite phones and alternative power supplies). Bringing
stakeholders into the mix also revealed gaps in the ability to count student populations
throughout the day in the event of crisis situations (Human, Palit, & Simpson). Similarly, a
study by the National Research Council in the 1980s recommended that the participation of
stakeholders is important to creating risk communication with optimal results (Lundren &
McMakin, 2009). However, in a crisis, this sort of give and take communication between the
message sender and receiver is not always possible. One solution is to involve the audience
in risk communication planning before a crisis occurs (Lundren & McMakin).
Diversity

The concepts of diverse student population groups, risk communication needs, and technological use can be explored to facilitate a greater understanding of international university students’ goals during crisis situations on campus. In 2013, a record number of 820,000 international students came to U.S. colleges (Chappel, 2013). Yet the growing numbers of international students and the dollars they bring may obscure the reality that international student groups are among the most at-risk populations on college campuses. Sherry, Thomas, and Wing Hong (2010) write that international students face problems including "difficulties adjusting to new cultural norms and homesickness...and language issues" (Chappel, p. 44).

Studies on racial and ethnic minorities underscore the importance of risk communication for diverse audiences. These studies show diverse communities are more vulnerable than others during disaster situations (Perry, Lindell, & Greene, 1982). Cultural and language barriers, lower perceived emergency risk, distrust of warning messengers, lack of preparation, and reliance on informal sources of information are all components of the hurdles facing non-traditional populations (Perry et al.). In the 1980s research comparing ethnic groups found numerous statistical variances among Caucasians, African Americans, and Mexican Americans regarding risk perception and disaster preparedness (Turner, Nigg, & Paz, 1980; Perry & Mushkatel, 1986). Perry and Mushkatel found ethnic minorities were less likely to evacuate due to warnings than their Anglo comparison group.

A report produced by the U.S. Department of Commerce following the deadly May, 2013 tornadoes in the Oklahoma City metro area specifically addressed the concern about non-English speaking publics during a crisis. In Oklahoma City, for example, the Hispanic...
population is one of the fastest growing in the region (National Weather Service, 2014). More than 12% of people in the U.S. speak Spanish at home (U.S. Census Bureau, 2013). These facts are underscored by the tragic realities of the 2013 tornadoes in the Oklahoma City area. Among those killed during the tornado outbreak were a Guatemalan family who drowned after undertaking incorrect tornado safety precautions (National Weather Service, 2014). Simply translating storm warnings from English to Spanish is not enough. The translation of “tornado warning” and “tornado emergency” mean the same things in Spanish, which can be the difference between life and death.

**Risk Perception**

Risk perception is multidimensional and involves hearing, understanding, and believing, as well as personalizing a risk (Aakko, 2004). Risk perception is also described as "a perception of threat...and the perceived severity of this threat" (Janssen, van Osch, de Vries, & Lechner, 2011, p. 93). Palm and Carroll (1998) noted it is important to identify groups with higher risk perceptions than others. Jenkin (2006) advocated that university officials to consider how publics perceive the likelihood of risks while creating crisis communication plans. Understanding how students perceive risks can help campus officials develop disaster plans and avoid negative impacts after a disaster (Burns, 2007).

General publics have different expectations in comparison to experts’ risk perceptions (Jenkin, 2006). Experts may feel that they have more control over an emergency, and, therefore, perceive less risk. (Sjöberg, Moen, & Rundmo, 2004). What university officials consider important to communicate to students about risk may not be perceived as important to the students themselves. Conversely, what university officials do not consider important may be considered as a priority for students. Jenkin identified
three reasons for this disconnect (a) the public’s assessment is based on a number of assumptions, (b) experts may not be perceived as credible by the public, and (c) experts may fail to consider what is important to the public.

People learn how to respond to disasters via indirect knowledge and personal experience, with indirect knowledge gained through social networks, mass media, and other sources, and personal experience gained after an individual has experienced the disaster (Johnson, 1993). When people move to a new place, they rarely have experience with disasters associated with the new place. Their social networks are limited, and one of the few ways to learn about what to do during an emergency is through the media. But for international students, local media sources may be difficult to locate and understand.

Zhang (1993) wrote that people with similar cultural backgrounds have similar risk perceptions. For example, Chinese citizens perceived the danger of pesticides and chemical fertilizers similarly to people from Hong Kong, but differently from those from European countries. Different social groups within the culture also often have varying perceptions of risks. For example, people in Tornado Alley know a lot about tornadoes, but little about tsunamis. Zhang stated that social norms, values, and practices are important elements processing information and making decisions. Studies found that the more a person knows on what to do during the crisis, the lower the risk perception and concern about the potential emergency (Johnson, 1993).

Technology

The mass media age is giving way to the networked age (Beckett & Mansell, 2008; Jarvis, 2006), and these changes have an impact on risk communication, in particular with younger individuals. Young adults aged 18-29 are the most active group in mobile phone
ownership in the U.S., at 98% (Pew Research, 2014). Individuals are increasingly using technology during times of disaster. Technology-assisted communication (TAC) allows a communicator to disseminate an immense amount of information with little effort and can also allow the user to customize usage (Lundren & McMakin, 2009). The information may be updated easily, which is a key factor, since crisis information can change on a moment-by-moment basis (Lundren & McMakin).

Media dependency theory explains students’ reliance on communication devices. The theory predicts that individuals develop dependencies on media that meet their needs of orientation, understanding, and play (Ball-Rokeach & DeFleur, 1976). Park, Kim, Shon, and Shim (2013) suggested that smartphone users are likely to form dependencies on the devices, in part based on ease of use. Tai and Sun (2007) found that during the SARS outbreak in China, audiences sought more information from short message services (SMS) and the Internet. Although technology can help communication be transmitted to more users more quickly, it cannot replace face-to-face communication. Wilson (1989) wrote, “the farther away we get from individual contact, the more room there is for confusion and misunderstanding” (p. 78). During a crisis, less confusion and misunderstanding can mean the difference between survival and death.

**Research Problems and Questions**

An individual’s background has a great impact on the way a person prefers to send and receive information. Small quantities of research exist on whether a students’ geographic origin, such as in-state, out-of state, and international, has an impact on how risk is perceived, what is known about emergency procedures, and what information is needed during the crisis. Because U.S. universities are becoming more diverse (Chappel,
2013), research identifying specific communication needs and weaknesses of international and out-of-state student groups is of significant importance to university risk communicators. Based on the literature review, the researchers propose the following research questions and hypothesis.

**RQ1**: Does the geographic origin of students have effects on how they perceive risk?

**RQ2**: Does the geographic origin of students have effects on their willingness to learn about disaster procedures?

**RQ3**: Does the geographic origin of students have effects on their awareness of safety procedures during times of emergency?

**RQ4**: What type of messages are or are not effective regarding safety procedures?

**RQ5**: Does the geographic origin of students have an effect on the ways in which they want to be communicated during emergencies?

**RQ6**: Does the geographic origin of students affect their opinions on whether it is the university’s responsibility to teach disaster preparedness?

**Methods**

The current study had several goals, to learn: (a) the awareness of international and out-of-state students on safety procedures during emergency, (b) how their awareness matches the safety procedures advocated by the university, (c) students’ choice of technology during a campus crisis, and (d) whether students believe it is the university’s responsibility to teach them disaster preparedness.

The study population for the current research included in-state, out-of-state, and international students enrolled at a large midwestern university in the Fall 2013. In Fall
2013, there were 23,944 students enrolled, including 15,189 in-state students, 7,004 out-of-state students, and 1,751 international students (OU Institutional Research & Reporting, 2014). A complete list of the students enrolled in Fall of 2013 was used to generate a randomized selection of 2000 students to be studied. Although limited to a single university campus, the results of the study potentially can have broader implications for other universities in the U.S., as the number of international students studying in the U.S. is increasing from year to year (Institute of International Education, 2012).

The first phase of the study involved data collection from the 2000 students, but with a low response rate for international students, the researchers identified a second sample and added approximately 1600 international students to the study. The survey instrument was a 24-item questionnaire administered online from April 4 to April 25, 2014 via Qualtrics. The researcher chose a survey instrument in concurrence with Fink's (2006) description that surveys are “information collection methods used to describe, compare, or explain individual and societal knowledge, feelings, values, preferences and behavior” (p. 1). The researchers used an online survey because they are an economical and convenient way to collect large amounts of data (Wimmer & Dominick, 2011). Participants received an initial recruitment email followed by two reminders via their university email addresses. Students were offered an online safety kit as a thank you for completing the questionnaire.

The questions for the survey were drawn from previous local surveys, articles, and disaster preparedness technical reports. The respondents answered 23 questions, most of which were Likert-scale. The possible answers on the scale ranged from 1 = strongly disagree to 7 = strongly agree. The researchers used the Likert-type scale because of the statistical advantages of the assumed interval level of measurement in the data analysis.
To assess how well different students were prepared for campus disasters, several questions were administered. The first question included five potential hazards: including tornado, fire, earthquake, shooting on campus, and contagious disease. Participants were asked to rate the likelihood of risk for emergent situations on campus based on their own knowledge. Two questions then examined how students perceived the importance of emergency safety procedures and how confident students were in their knowledge. The questions such as “I am confident about the safety procedures to take during a tornado event” were also asked for fires, earthquakes, and potential shooting on campus.

To assess the dependent variable of how students’ awareness matched the safety procedures advocated by the university, several questions referred to what and how university officials communicated to students regarding emergency situations on campus. One question, “I have learned from university officials what to do if there is a tornado on campus,” asked students to rank their knowledge of emergencies ranging from tornado preparedness to a fire on campus. Additionally, based on published safety guides, four questions examined the knowledge of university students regarding which safety procedures to take during the following emergencies on campus: tornadoes, fires, earthquakes, and shooter on campus.

Three questions sought to understand how students would like to be informed about emergency procedures via sources and channels. One question asked whether students think students they are responsible for learning about emergency safety procedures or whether university officials should teach them how to prepare. Researchers also asked whether study participants have ever been personally affected by a disaster.
Researchers used the independent variable of “geographical status description” (in-state, out-of-state, international) to determine statistical differences between groups based on their geographic knowledge base. After selecting a geographic status, students further identified their country or origin and preferred language for communication. Based on the students’ geographic status, perceptions of hazards and emergency procedures were analyzed. The researchers used Cronbach’s alpha analysis to measure reliability of the scales. Pearson’s correlation, multiple regression, factorial analysis, t-tests, and ANOVA were performed by the researchers in SPSS ($p < .05$) to determine the significance of the findings.

**Findings**

More than four percent (152 students) of the total sample completed the survey. Fifty-seven percent described themselves as in-state students, while 26% and 15% described themselves as out-of-state and international students, respectively. Eighty-five percent reported that English is their primary language, and 15% described themselves as speaking another language. Of the respondents, 63% were female, while 37% were male. Sixty-four percent said they have lived in the university community for more than two years, while 19% reported they have lived in the area less than one year. Seventeen percent said they have lived in the city between one and two years. Sixty-seven percent of those surveyed were 25 years of age or younger. The majority of students in the study described themselves as Caucasian (69%), while the next highest percentage of ethnicity was Asian (13%). Other races were in the single digits.
A one way ANOVA test was conducted to answer RQ1 regarding whether the geographic origin of a student has an effect on how a student perceives risk. There was no statistically significant difference found among the groups of in-state, out-of-state, and international students about the statement that a tornado is a likely risk for potential disaster in the University of Oklahoma campus. All three groups reported that tornado is a likely risk, $F(3, 143) = 1.506, p > .05$. However, there was statistically significant difference regarding the statements that a fire, a damaging earthquake, and a shooter on campus are likely risks. In terms of fire, $F(3, 143) = 3.609, p < .05$, in-state ($M = 4.02, SD = .831$) and international ($M = 4.00, SD = .953$) students showed significantly more agreement than out-of-state ($M = 3.59, SD = 1.040$) students that a fire is a risk for potential disaster. In terms of earthquake, $F(3, 143) = 3.298, p < .05$, international ($M = 3.57, SD = 1.273$) students showed significantly more agreement than out-of-state ($M = 2.70, SD = 1.024$) and in-state ($M = 2.91, SD = 1.065$) students that a damaging earthquake is a risk for potential disaster. In case of a shooter on campus, $F(3, 143) = 2.694, p < .05$, international ($M = 4.09, SD = 1.041$) students showed significantly more agreement than out-of-state ($M = 3.38, SD = 1.139$) and in-state ($M = 3.62, SD = .899$) students that a shooter on campus is a risk for potential disaster.

A one-way ANOVA was conducted in order to answer RQ2. There was no statistically significant difference found among the groups of in-state, out-of-state, and international students about the statement that it is important to learn what to do in an emergency. All three groups showed an interest in emergency knowledge, $F(3, 143) = 1.145, p > .05$. However, there was a statistically significant difference found about the statement regarding the students desire to learn more about how to stay safe during campus crisis events and the statement that the students might have trouble understanding instructions
during a campus emergency. In case of learning safety during campus crisis events, \( F(3, 143) = 3.196, p < .05 \), international (\( M = 4.43, SD = .728 \)) students showed significantly more agreement than out-of-state (\( M = 3.78, SD = .976 \)) and in-state (\( M = 4.13, SD = .794 \)) students that they want to learn more about how to stay safe during campus crisis events. In terms of the statement that they might have trouble understanding instructions during a campus emergency, \( F(3, 143) = 3.106, p < .05 \), international (\( M = 2.87, SD = 1.140 \)) students showed significant agreement that they might have trouble understanding instructions during a campus emergency, but out-of-state (\( M = 2.32, SD = 1.002 \)) and in-state (\( M = 2.16, SD = 1.027 \)) students showed significantly slight disagreement with the statement. Moreover, all three groups of students showed confidence that they are well prepared for a campus emergency situation, \( F(3, 143) = .494, p > .05 \), and they know how to find information during campus emergency, \( F(3, 143) = .188, p > .05 \) (see Table 2).

Eight questions of the questionnaire were aimed at learning what students know about tornado safety procedures to answer RQ3. A factor analysis was performed to find what underlying constructs measured tornado safety behaviors. Three factors were identified: "tornado sighted behaviors," "safe place behaviors," and "tornado terminology/shelters." "Tornado sighted behaviors," had an eigenvalue 3.0 and explained 37% of the common variance. "Safe place behaviors" had an eigenvalue of 1.4 and explained 18% of the common variance. "Tornado terminology/shelters" had an eigenvalue of 1.1 and explained 14% of the common variance. The loadings on the third factor had opposite signs, which indicated confusion people had while answering questions about terminology.
Based on factor loadings, two reliability scales were created. The first scale, "tornado sighted behaviors," was created from the reversed questions "It is best to drive home a tornado is sighted in the area," "If I hear a tornado siren, I should leave the campus and get home as quickly as possible," and "During a tornado it's best to go to the highest floor of the building" (Cronbach's alpha = .851). The second scale was "safe place behaviors" and included the questions "During a tornado, I should avoid windows" and "During a tornado, you should go to the lowest level of the building" (Cronbach's alpha = .640). Two scales positively correlated with each other (r(299)=.335, p < 0.01).

A one-way ANOVA was conducted that examined the effect of students' status on tornado knowledge, including "tornado sighted behaviors," "safe place behaviors," shelters, tornado warning, and tornado watch. The main effect of status was significant on "tornado sighted behaviors", (F (2, 144) = 5.586; p = 0.005) and "safe place behaviors," (F(2, 145)= 3.825), p = 0.024).

RQ3 asked if the geographic origin of a student affected awareness of emergency safety procedures. Post hoc comparisons using the Tukey HSD test found differences among international, in-state, and out-of-state students. The Tukey HSD test indicated that the mean score for international students (M=4.318, SD = 1.08) was significantly different than the mean of in-state students (M = 4.678, SD = .055 and the mean of out-of-state students (M=4.87, SD = .26) for the "tornado sighted behaviors." Post hoc comparisons using the Tukey HSD test also indicated that the mean score for international students (M=4.48, SD = .073) was significantly different than the mean of in-state students (M= 4.79, SD= .44) and the mean of out-of-state students (M=4.77, SD = .43) for the "safe place behaviors." A statistically significant difference exists between the level of people's
knowledge of tornado emergency procedures and their knowledge of terminology. All students showed statistically significant less knowledge of what a tornado watch ($M=3.96$, $SD =1.315$) is in comparison with the knowledge of "tornado sighted behaviors" ($M=4.67$, $SD =.63$, $t(149) = -7.022, p < 0.01$) as well as “safe place behaviors” ($M=3.27; SD=1.52, t (149) = -7.053, p < 0.01$). The same was true for tornado warning ($M=3.24, SD=1.52$) with statistically significant less understanding of what tornado warning is in comparison with the tornado movement scale ($M=4.67, SD =.63$, $t (149) = -11.505, p < 0.01$) as well as the “safe place behaviors” ($M=3.27; SD =1.52, t(149) = -10.215, p < 0.01$).

However, a one-way ANOVA did not yield a significant difference between students of different status on their knowledge of fire emergency safety procedures in all four questions related to fire safety (V1: $F(2, 145) =1.877, p > 0.05$; V2: $F(2, 144) =1.21, p > 0.05$; V3: $F(2, 145) =.89, p > 0.05$; V24 $F(2, 145) =2.44, p > 0.05$). Also, a one-way ANOVA did not yield a significant difference between students of different status on their knowledge of earthquake emergency safety procedures in two questions related to earthquakes (V1 “If a damaging earthquake occurs and I am already outside, I should stay there:” $F(2, 145)=.230, p > 0.05$; and V2 “If I am inside, it is a good idea to get under the desk:” $F(2, 144)=.735, p > 0.05$). However, the question “A doorway is a good place to stand during an earthquake” showed some significance ($F(2,145) = 3.26, p < 0.05$). The Tukey post hoc test showed that international students ($M=2.91, SD =1.38$) are less likely than in-state students ($M=3.62, SD = 1.097$) to think the doorway is a good place to stay during an earthquake at $p < 0.05$.

To answer RQ4 regarding effectiveness of university communication, the researchers conducted a one-way ANOVA. The results suggest that international students are less likely to be aware of what to do during tornadoes, earthquakes, and shooting
emergencies despite campus educational efforts on the subjects. Researchers found significance on two out of four questions (Question: “If I see a person with a gun, I should run from my building to another building:” F(2, 145) = 4.634, p < 0.05; and the question “It is helpful to sing and tell jokes to pass the time when in a lockdown situation:” F(2,145) = 11, 846, p < 0.01). Because Levene’s test showed significance for the question about jokes, the confidence level was reduced to p=0.01. In the results, Tukey post hoc comparisons indicated that the mean score for international students (M=3.43, SD = 1.23) was significantly lower than the mean score of in-state students (M= 4.4, SD = .88) and of out-of-state students (M=4.49, SD = .65) for the question about jokes at p < 0.01. No significant difference for the question about running from the building was reported at p < 0.005.

RQ6 asked if the geographic origin of a student would have an effect on the device(s) from which a student would want to be communicated during an emergency. A t-test showed statistical significance with the statement that students wanted to learn about emergency procedures from their phone (M=4.73, SD=.601, t=96.345, p < 0.05) and from their instructor (M=4.33, SD=.831, t=63.736, p < 0.01). An ANOVA test indicated significant effects of students’ geographic origin on their preferences for interpersonal communication. International students (M=3.89, SD=.75) more than out-of-state students (M=3.25, SD=.93) preferred learning about emergencies from the interpersonal communication at p < 0.05.

Students significantly agreed they wanted to learn about emergency procedures through text messages (M=4.60, SD=.601, t=93.353, p < 0.01), email (M=4.36, SD=.87, t=61.078, p < 0.01), and phone call (M=4.1, SD= .995, p < 001). Factor analyses identified two factors of students’ preferences. The first factor "outside media" that included local
news media, social media, and outside news media websites had an eigenvalue of 2.32 and explained 33.2% of the common variance. The second factor composed of text, email, and a phone calls had an eigenvalue of 1.5 and explained 22% of the common variance.

Students wanted to learn more about the emergency procedures through the campus email ($M=4.14$, $SD=.933$, $t=53.429$, $p < 0.01$) and the OU website ($M=3.89$, $SD=1.183$, $t=48.143$, $p < 0.01$). A one-way ANOVA test indicated that there was a statistical significance effect of status on the way students wanted to learn about emergencies via an on-campus non-credit course ($F(2,141) = 11.424$, $p < 0.01$) and lecture ($F(2, 142) = 6.508$, $p < 0.01$). Statistical significance was found in international student’s desire to learn about emergency procedures through an on-campus non-credit hour ($M=3.33$, $SD=1.175$) than in-state students ($M=2.07$, $SD= 1$) and out-of state students ($M=2.17$, $SD= 1.13$, $p < 0.05$). The same is true in the finding that international students were statistically significantly more willing to learn about emergency procedures through lectures ($M=3.55$, $SD=1.26$) than in-state students ($M=2.67$, $SD= 1.13$) and out-of state students ($M=2.49$, $SD= 1.67$, $p < 0.05$).

A chi-square test further illuminated RQ5 students’ technological preferences during emergencies. The chi-square test results were significant ($x^2=220.440$, $df=8$, $N=150$, $p < 0.01$) with the finding that text messages were the main source of information during a campus shooting alert in January, 2014. Learning through friends about the emergency scored second. Only two people out of 150 received information about the shooting alert through social media. Additionally, a cross-tab test did not indicate any effect of geographic status on how students received information during the alert ($x^2= 17.007$; $df=16$, $p>0.05$).

RQ6 (do students believe it is the university’s responsibility to teach them disaster preparedness?) was also supported by the findings. Students agreed statistically more with
“It is the university’s responsibility to teach students about campus emergency safety procedures” \((M=4.35, SD=.651, t=80.471, p < 0.05)\) than with the statement “It is the student’s responsibility to learn about emergency safety procedures on campus” \((M=3.79, SD=1.029, t=44.322, p < 0.05)\). Therefore, if students are not ready for an emergency, they will more likely to attribute responsibility for that to the university officials. This attribution may harm the university’s reputation if the crisis is not handled well.

A t-test showed a statistically significant difference regarding the types of emergency safety procedures the university had communicated to students. The respondents indicated that the university taught them significantly more about tornadoes \((M=3.64, SD=1.24, t(147)=35.486, p < 0.01)\) than about potential shootings on campus \((M=3.07, SD=1.2, t(148)=30.979, p < 0.01)\), fires \((M=2.94, SD=1316, t(148)=27.178, p < 0.01)\), and earthquakes \((M=2.15, SD=1.07, t(146)=24.246, p < 0.01)\).

**Discussion**

This study of college students on a middle-America university campus finds significant differences among international, out-of-state students, and in-state students in knowledge and perceptions of potential crisis situations on campus, as well as differences in their technology and overall communication preferences during campus disasters.

The findings for RQ1 specifically demonstrate that international students in particular see events such as fires, earthquakes, or a shooter on campus as a higher risk situation than do in-state students. RQ2 found that all geographic groups believed in the importance of learning about emergency safety procedures, as well as confidence in their preparedness for a potential disaster. However, international students in particular believed they might have trouble understanding instructions during an emergency. The
findings for RQ3 show that all three geographic groups lack important safety knowledge, in particular regarding tornado safety information and the differences between tornado watches and tornado warnings. Despite campus materials and campaigns about safety procedures, RQ4 found that international students are less likely to know what to do during tornadoes, earthquakes and a shooting event on campus. As an example, RQ4 found significantly higher numbers of international students believing it was appropriate to run from one building to another in the event of a mass shooting attempt, despite online campus materials with the opposite advice. RQ5 found that if a crisis were to occur while students were in class, students would prefer both interpersonal and cell phone communication from university officials, which also mirrored the results for RQ6 regarding technology preferences and the student’s geographic origin. RQ7 found that international students were more willing to want to get additional information about potential disasters from a non-credit course or lecture, than were in-state and out-of-state students.

The findings of this study amplify existing scholarship on disaster preparedness, students, and diverse population groups, in particular the three-challenge approach that frames this research: knowledge, process, and communication skills challenges. The findings here demonstrate that audiences from different geographic areas have a different understanding (knowledge challenge) of the risks which threaten the university campus. In particular, diverse population groups need to understand risk factors and safety procedures (Kailes & Enders, 2007). The study also finds the need for audiences to be involved in the risk communication process (process challenge). Finally, the communication skills challenge is underscored by the need for audience members (students) to be able to understand the information they receive. In this study, for example,
international students were statistically more likely to have a fear of not understanding instructions in the event of an emergency. Information dissemination during times of crisis may be hindered for a variety of reasons, including cultural and language differences, distrust of messengers, and expert’s lack of understanding about the receiver’s knowledge level (Lindell, et al., 2006; Perry, et al. 1982; Sjoberg, et al., 2004).

In this example of a Midwestern U.S. campus with a diverse student population, students show they can be confused about safety procedures during natural disasters, such as tornadoes and earthquakes, and manmade crisis, such as a shooter on campus. But the students also provide a road map for their university communicators, by showing a need for both interpersonal communication from university officials, such as instructors in the classroom, as well as a need for communication via mobile technology during a crisis. International students in particular desire additional training about potential campus emergencies, including classroom training without class credit.

As the number of international students in the U.S. grows, the findings of this research underscore the need for universities need to improve efforts to include students in the creation of specific risk communication strategies to account for the unique needs and concerns of diverse populations. International associations on campus can be good resources to start the conversation with students from all corners of the globe.

This means that if students are not ready for an emergency, they will more likely to attribute responsibility for that to the university officials. This attribution may greatly harm the university’s reputation if the crisis is not handled effectively.

**Limitations**
Limitations of the study include the small sample size of the international population. Additionally, the late April field date of the research may have been impacted by the crush of end-of-semester activities for students, which led to the low response rate of four percent. The geographic location of the study may also be a limitation of the study. While students showed some knowledge of tornado preparedness, different results could occur in parts of the country with less media presence about tornadoes in general.

Suggestions for further research include studies with larger sample sizes of international students to learn on a deeper level about their knowledge of potential campus disasters, as well as the ways in which they would like to receive communication during crisis situations. Other research should be conducted on college campuses in different regions of the country to compare knowledge of different kinds of weather disasters. Further analysis of university risk communication procedures at a variety of universities across the country may be helpful in generating and sharing best practices lists. Universities that succeed in keeping students safe in times of disaster should also be studied and their ideas shared with other learning institutions.

Universities devote time, energy, and resources to recruit students from all corners of the globe. This study suggests that universities must continue to find new ways to inform diverse and non-traditional campus populations about risk situations. International students can be a vulnerable population group on campus; but out-of-state students may also have vulnerabilities that aren't generally prioritized by universities. Priority must be given to these groups in teaching, training, and communicating about crises on campus.
References


Table 1

One way ANOVA test for comparing students’ knowledge about potential risks at the OU campus.

<table>
<thead>
<tr>
<th>Risk Description</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>A tornado is a likely risk.</td>
<td>2.767</td>
<td>3</td>
<td>.922</td>
<td>1.506</td>
<td>.215</td>
</tr>
<tr>
<td>A fire is a likely risk.</td>
<td>8.887</td>
<td>3</td>
<td>2.962</td>
<td>3.609</td>
<td>.015*</td>
</tr>
<tr>
<td>A damaging earthquake is a likely risk.</td>
<td>11.701</td>
<td>3</td>
<td>3.900</td>
<td>3.298</td>
<td>.022*</td>
</tr>
<tr>
<td>A shooter on campus is a likely risk.</td>
<td>7.940</td>
<td>3</td>
<td>2.647</td>
<td>2.694</td>
<td>.048*</td>
</tr>
</tbody>
</table>

*Note: p is significant at .05 level.
Table 2

One way ANOVA test for comparing students’ opinion about OU campus emergency statements.

<table>
<thead>
<tr>
<th>Please rate your opinions about the following campus emergency statements</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is important to know what to do in an emergency.</td>
<td>.809</td>
<td>3</td>
<td>.270</td>
<td>1.145</td>
<td>.333</td>
</tr>
<tr>
<td>I want to learn more about how to stay safe during campus crisis events.</td>
<td>6.660</td>
<td>3</td>
<td>2.220</td>
<td>3.196</td>
<td>.025*</td>
</tr>
<tr>
<td>I am well-prepared in the event of an emergency.</td>
<td>1.316</td>
<td>3</td>
<td>.439</td>
<td>.494</td>
<td>.687</td>
</tr>
<tr>
<td>I know how to find information about what to do in a campus emergency.</td>
<td>.720</td>
<td>3</td>
<td>.240</td>
<td>.188</td>
<td>.904</td>
</tr>
<tr>
<td>I might have trouble understanding instructions during a campus emergency.</td>
<td>9.995</td>
<td>3</td>
<td>3.332</td>
<td>3.106</td>
<td>.028*</td>
</tr>
</tbody>
</table>

*Note: p is significant at .05 level.*