

# Determining Credible Sources During an Emergency Situation

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## ABSTRACT

An important aspect of working in an emergency operations center (EOC) is determining what information is credible and what actions to take based on that information. Information during an emergency may come from various sources and EOC workers may not know the information providers personally. Information may come from electronic sources where the exact source of the information may be unknown and credibility may be affected.

For this study, we conducted ethnographic interviews with emergency management subject matter experts to gain insights on credibility. The interviews included a series of questions to learn about the current processes of an EOC, what sources generally provide information about the situation and what factors determine credibility. These interviews are ongoing and this paper provides a summary of the interviews completed at this point. The expected outcome of this study is a potential software system with features to enhance credibility despite weak source information.

## Keywords

emergency management, trust, credibility

## INTRODUCTION

During an emergency, assessment of the situation and decisions about how to manage or end the emergency are made in an Emergency Operations Center (EOC). First responders need to accomplish various duties such as monitoring and analyzing data, communicating the status of the situation to others, determining a course of action as well as collaborating with other workers in the EOC and the field. These aspects lead to five unique challenges when working in an EOC: high stress, irregular work pattern, information overload, intense collaboration and diverse experience (Milewski, 2005).

EOC workers will receive data that pertains to the current emergency from various sources. They might not be able to verify the credibility of the information since it is coming from unknown source. This source may be the news media, a rumor, another first responder worker or an anonymous tip. In this situation, the EOC worker must decide if this information is trustworthy despite lacking information on the expertise of the source as well as working in an intense, stressful environment.

For this study, we interviewed five EOC workers with an average of 20 years of experience. Each interviewee worked in various emergency situations and significant incidents where they had to decide whether or not to trust information from various sources. Interviewees were asked a series of questions to determine how they decided to trust a source and what factors make sources seem more trustworthy. The focus of these interviews was on electronic sources and information since the anticipated result of this research is a software system with features to facilitate trust and support decision making in the EOC.

**Reviewing Statement:** This paper represents work in progress, an issue for discussion, a case study, best practice or other matters of interest and has been reviewed for clarity, relevance and significance.

Ultimately, these interviews are focused on answering three main research questions. These questions are as follows:

- What factors make information seem inaccurate or untrustworthy during an emergency?
- What factors make a source of information seem inaccurate or untrustworthy during an emergency?
- How does stress affect decisions made during an emergency?

These interviews are still in process and this paper provides a high level findings report. As more interviews are completed, a more in-depth analysis will be conducted using qualitative coding and data analysis.

## RELATED RESEARCH

In the emergency management domain, credibility determines the effectiveness of agent systems and the ad-hoc teams which may form during an emergency.

In the agent system described by López, Innocenti and Busquets, a trust model is used to determine which ambulance should be dispatched to an emergency using an algorithm taking into account the distance of the call, its priority and the experience of the ambulance crew. (López, Innocenti, & Busquets, 2008).

The level of trust in a newly formed team may be low in the emergency operation center. As explained by Altschuller and Benbunan-Fich (Altschuller & Benbubab-Fich, 2008), when an emergency occurs teams must form quickly to contain and hopefully end the situation. These teams do not work together often and may even be collaborating together remotely. In an emergency situation, there are high levels of stress and urgency. Trust is a key factor to have successful interactions between team members. Altschuller and Benbunan-Fich describe various factors which may influence trust among ad-hoc teams.

Other credibility studies have most recently focused mainly in the areas of the Internet such as e-commerce, virtual teams, and social networking (Riegelsberger & Vasalou, 2007) and mobile devices such as cell phones, PDAs, and GPS devices (Fogg B., 2003).

## METHODOLOGY

Interviewees are volunteers solicited from the emergency management community. Interviews were conducted over the telephone or in person and on average took about 1 hour to complete. The interviewers used an interview guide to facilitate the interview. Table 1 displays the interview guide used during these interviews. This guide was developed to learn more about the current operating procedures in the EOC and to assess the factors that impact credibility. It is expected that this interview guide will be further refined as more interview data is collected.

Question Type	Questions
Background Questions	<ol style="list-style-type: none"> <li>1. How many years of experience do you have working in emergency management?</li> <li>2. What type of training have you had in emergency management?</li> <li>3. Do you think you have any special qualification that would benefit the EOC atmosphere?</li> </ol>
Main Interview Questions	<ol style="list-style-type: none"> <li>1. In the EOC, where does information about the current situation come from?             <ol style="list-style-type: none"> <li>1.1. What form does the information come in?</li> <li>1.2. Is there a process for handling new or updated information as it comes into the EOC?</li> <li>1.3. What tools are used to manage information?</li> <li>1.4. Is the information assigned a priority number for action/analysis? If so, how is the priority determined?</li> </ol> </li> <li>2. What types of electronic sources provide information to the EOC?             <ol style="list-style-type: none"> <li>2.1. Do you always know where the information came from or who provided the information?</li> <li>2.2. Do you try to verify the information against other sources?</li> </ol> </li> </ol>

	<ol style="list-style-type: none"> <li>3. Do you trust all electronic information sources in the EOC?             <ol style="list-style-type: none"> <li>3.1. If not, what factors make a source seem untrustworthy?</li> <li>3.2. How do you handle information from untrustworthy sources?</li> </ol> </li> <li>4. Does information provided to the EOC ever turn out to be inaccurate from an electronic source?             <ol style="list-style-type: none"> <li>4.1. How did you determine the information was inaccurate?</li> <li>4.2. Are there any factors that point the information being inaccurate?</li> <li>4.3. What happens to information and its source when it is considered to be inaccurate?</li> </ol> </li> <li>5. Has important information ever come from a previously unknown electronic source during an incident?             <ol style="list-style-type: none"> <li>5.1. If so, how was that information handled?</li> <li>5.2. Did you try to validate the source and its information against a trustworthy source?</li> <li>5.3. Was the source considered trustworthy eventually?</li> </ol> </li> <li>6. How much experience do you have with your team members?             <ol style="list-style-type: none"> <li>6.1. Do you only work with a few key team members often?</li> <li>6.2. What types of tasks does the team perform during an emergency in the EOC?</li> <li>6.3. How do you communicate with all the team members during an emergency? Are a good number of them remote/virtual teams located physically outside the EOC?</li> <li>6.4. Are the team members experienced with working in an EOC? If not, does this affect your ability to trust their judgment/input?</li> </ol> </li> <li>7. The EOC can be considered a stressful working environment. How you think stress can affect how decisions are made?             <ol style="list-style-type: none"> <li>7.1. In a stressful situation, are you more likely or less likely to trust information from other sources?</li> <li>7.2. If not, would you try to validate the source and its information against a trustworthy source?</li> </ol> </li> </ol>
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**Table 1. Interview Guide Questions**

### CREDIBILITY OF SOURCES AND INFORMATION IN THE EOC

Credibility is most purely defined as believability. The evaluation of credibility can differ between people and situations. There are various elements that can factor in to the level of credibility. Credibility is seen as a perceived quality since it only exists when there is an assessment of person, object or information. There are two key aspects to credibility: trustworthiness and expertise. The sources that are rated most creditable are those with high levels of trust and expertise (Fogg B., 2003).

There are different aspects from various areas that affect the overall credibility. These include the source characteristics (Rieh & Danielson, 2007; Dijkstra, Liebrand, & Timminga, 1998), message characteristics (Rieh & Danielson, 2007; Maglaughlin & Sonnenwald, 2002) receiver characteristics (Fogg B. J., 2003; Leckie, 1996; Luthan & Koester, 1976) and context/environment characteristics (Fogg B.J., 2003). All of the interviewees discussed how these factors affected their ability to trust the source and the information. During an emergency, information comes into the EOC from various sources. All interviewees explained emails, newsfeeds, instant messages, Twitter, video feeds, radio and cell phones were valid means of communicating information. The interviewees will be cited as Interview #1, Interview #2, Interview #3, Interview #4 and Interview #5.

### Source Characteristics

When an EOC worker is evaluating the information to determine if it is credible, they may start by determining the level of credibility of the source of the information. Interviews #1 and #4 both stated that the incident commander at the EOC is considered a trusted source of information during an emergency. Both interviews

explained since the incident commander is managing the situation, it may be difficult to reach him or her to verify information. This may delay important decision making and affect the outcome of the situation.

Interviews #1 and #3 explained that the news media is generally considered an untrustworthy source as a situation unfolds. Both interviews state the news media may help to spread rumors and bring about panic in the early moments of the emergency. Interview #3 believed these rumors cause incorrect information to be passed to the EOC and delay decisions on courses of action.

Interviews #3 and #5 believed a source to be valid when various other sources provided the same information. He cited an example of a tip coming in from a person at the scene of a potential incident. Before sending resources out to the field, the subject of Interview #3 was able to verify the information using a video feed in the EOC.

In the EOC, Interviews #1, #3 and #4 have worked with the same core group of people during various situations. This aids in trusting information since all the sources have worked together before in high stress situations and know the capabilities of their team members. Interview #3 revealed that businesses and organizations often hire staff members with connections to various government agencies in order to build an informal network of credible sources to verify information with or get information from during a situation. Interview #3 explained it was very important to form relationships with other EOCs and agencies so you have a trusted network to utilize during an emergency. Interview #3 stated knowing the person who provides the information helps to quickly determine its credibility.

Knowing the source may not always lead to information being considered credible. Interview #3 described situations where groups may have hostilities between each other and are less likely to believe the information being passed back and forth. For example, a doctor may be less likely to trust information from an emergency medical technician (EMT) and reevaluate a patient once they arrive at the hospital.

In the event that a source is required to prove himself trustworthy to an information receiver, Interview #2 explained that the source needs to provide common information that the source and the receiver would both know but is not known to the general public. Interview #2 illustrated how he was able to prove himself as a credible source during an emergency situation. While at the scene of an incident, he had to use a telephone to call up the main agency with information. Since the telephone number was unknown to the operator, the operator could not verify his identity. Interview #2 explained that he stated information that only someone who worked for the agency would know, in this case he named all the staff hierarchy of the organization, and the operator connected him to the person he was trying to reach.

Often, there is not enough time during an emergency to completely validate all sources of information. Interview #2 explained when working with new team members, you regularly have to assume everyone is credible and trying to provide correct information.

### **Message Characteristics**

Trusters may also determine the credibility of the message based on its relevance to their current problem or search (Rieh & Danielson, 2007). Interviews #1 and #2 established the credibility of the information through the language used in the message. Does the message use the correct EOC domain vocabulary? Are there misspellings of common words and acronyms? Is the message relevant to the emergency situation?

Interviews #2, #4 and #5 trusted a message, such as one from an electronic source, which cites contact information in order to follow up on the information. Since the information can be traced to a person, the information is determined to be more trustworthy.

### **Receiver Characteristics**

The EOC worker or the “receiver” of the message is also a factor in credibility. The experience the user has with the source or in the case of information systems, computers, also factors into the perceived credibility. It has been noted that experienced computer users are less likely to rely on advice from computer expert systems while new users are more likely to take suggestions from computers (Luthan & Koester, 1976). Interview #1 stated there is often a disconnect between the technology in the EOC and training. EOC workers do not use the tools provided in the EOC often enough to trust them and often turn to technology they are more comfortable using such as email and instant messenger. Interview #3 agreed with these points, also adding that there are a lot of useful tools in the EOC for collaborating and sharing information, however in an emergency people turn to tools in which they are familiar. Interviews #3 and #5 included Twitter as a tool that EOC workers use as alternative to EOC technologies. Interview #4 summed up explaining people are more likely to find the technology they have the most experience with trustworthy.

Experience is also factor when determining the usefulness or relevance of a piece of information. For example, faculty members have more experience with their chosen subject and important issues and therefore will be better equipped to evaluate information than a student (Leckie, 1996). Interview #3 revealed that EOC workers with more experience with emergency situations are better equipped to determine if information is credible.

### **Context/Environment Characteristics**

The environment that the EOC worker is receiving the information in may adversely affect their willingness to find it credible. As explained in the Prominence-Interpretation Theory, the context or environment in which a person is in may influence how credible they judge a source (Fogg B., 2003).

The EOC is often considered a stressful working environment (Milewski, 2005) which may affect how information is trusted. Interview # 2 revealed that decisions need to be made quickly without the opportunity to consult various sources for information. Many decisions need to be made at once which adds to the stress of the situation. Interview #3 explained stress is caused by information coming in from various different sources and the need to prioritize that information.

### **CONCLUSION**

Various factors can affect the credibility of information and its source during an emergency. Interviewing emergency management subject manager experts provided real life experiences of these issues and how they affect the decisions made during an emergency. It is important that EOC workers can quickly determine the credibility of information and how they should act on it. These interviews are ongoing and more formal analysis will be conducted as more data is collected. The outcome of this research is the development of a software tool or system to better facilitate credibility and decision making in the EOC.

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