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Collaboration Research for Crisis Management Teams

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Abstract

To aid research in crisis management, we reviewed the literature pertaining to synchronous, non-collocated, cross-organizational, time-sensitive collaboration. We examined the theoretical constructs that

researchers have proposed for collaborative systems and determined that several of these, such as common ground and awareness theory, have particular applicability to crisis management. We reviewed collaboration models that were developed to provide frameworks for understanding the multiple facets of technological support to group work. Because teams normally need to come to a common understanding of the situation and the relevant decisions, we examined research in team awareness, sensemaking, and decision-making. Types of group tasks affect technology use and adoption, so we considered the literature surrounding these topics, as well, before turning to case studies of new collaboration technologies. We end with our assessment of the findings most relevant to developing new crisis management collaboration approaches, including procedures, needed functionality, and candidate capabilities.

Keywords: Crisis management, cross-organizational collaboration, distributed collaboration, synchronous collaboration.

Contents

1

Introduction

A common thread in domains such as aviation security, military command and control, and emergency response is the necessity for people from multiple distinct organizations to work together quickly to solve high-stakes problems requiring a wide range of collaborative decision-making. We refer to this type of activity as large-scale crisis management. "Crisis" is defined by Pauchant and Mitroff as "a disruption that physically affects a system as a whole and threatens its basic assumptions, its subjective sense of self, its existential core" [81, p. 15].

A crisis such as 9/11 is a prime example. The response to 9/11 involved the airlines, the Federal Aviation Administration, fire/rescue personnel, the military, non-governmental agencies such as the Red Cross, and others up to the highest levels of the US Government. The situation required immediate action and minutes were precious, as illustrated by the fact that the South Tower collapsed only 56 minutes after it was impacted.[1] The stakes were very high: besides the lives of 2993 people that were lost as a result of the attacks, the terrorists exposed weaknesses in national security, shut down the US's air transportation

[1] All facts regarding September 11, 2001 were taken from the "Complete 911 Timeline" at History Commons, www.historycommons.org.

system for more than a week, damaged American's sense of safety in our homeland, and prompted the US to wage war in the Middle East. Examples of collaborative decision-making on that day included determining which aircraft had been hijacked, whether to launch fighter aircraft, and under what specific conditions to evacuate the White House. The high degree of stress and the gravity of the situation made it extremely challenging to work across organizations and yet such collaboration was highly important to ensure effective crisis management.

The 9/11 disaster was not the only large-scale crisis management situation to occur in recent memory. The Indian Ocean tsunami in 2004, the London subway and bus bombings in 2005, Hurricane Katrina in 2005, the Java, Indonesia earthquake in 2006, the Samoa tsunami in 2009, and the Haiti earthquake in 2010 each involved multinational collaboration of numerous governmental and non-governmental organizations. To cite a specific example, failure to effectively collaborate across organizations during Hurricane Katrina prolonged the suffering of hundreds of thousands of people, prompting President Bush to state that the US must improve its crisis preparedness and response [10].

As members of the collaboration research community, we hold the belief that appropriate collaboration technologies and processes can be used to better support the large, heterogeneous communities that work together in times of crisis. Our work aims to turn this belief into reality, and this monograph summarizes the background upon which we are building. Specifically, this monograph shares our review of the relevant literature pertaining to collaboration that is, at the same time: synchronous, non-collocated, cross-organizational, time-sensitive, and dealing with crisis management. Because there is a limited set of research that is specific to all of these characteristics, some of the research we examined has broader or more general applicability while still having important implications for crisis management collaboration.

This monograph is organized along the continuum from theoretical to practical, and from abstract to concrete. We begin with a brief summary of the theoretical basis for collaboration in Section 2 because of the potential for collaboration theories to explain and predict behaviors of crisis management teams that are important for technology to support. To greater or lesser degrees, these theories inform the models

that are presented in Section 3. The models describe collaboration processes and activities, and ground theoretical concepts by operationalizing them and organizing them into frameworks.

Next in the progression from the abstract to the concrete we address sensemaking, team awareness, and team decision-making in Section 4. While they arise from different research traditions, all three of these non-domain-specific concepts are necessary for successful collaboration and take place during many (or all, depending on the model) of the phases or levels described by the models. They are also necessary for meeting the collaboration technology adoption challenges described in Section 5. The concepts of sensemaking, team awareness, and team decision-making are somewhat more abstract than the other

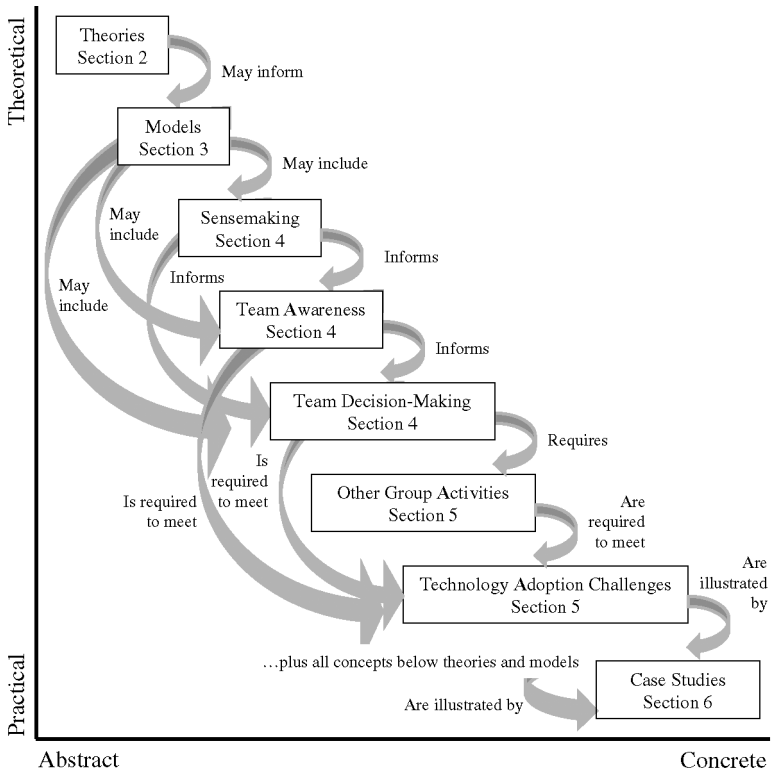

Fig. 1.1 Relationships among the topics covered in this monograph. The topics fall along two continua, from theoretical to practical, and abstract to concrete.

collaborative activities such as brainstorming and information dissemination that are discussed in Section 5.

The group activities described in both Sections 4 and 5 are illustrated in a selection of case studies that are presented in Section 6. The case studies provide concrete examples of the range of technologies and processes that can support crisis management teams. We end with a summary and implications for future research in Section 7. Throughout this monograph, we use examples from the aviation security domain to illustrate how the concepts surveyed in this monograph could inform collaboration in a 9/11-type situation.

The topics addressed in this monograph present important facets of crisis management collaboration that have intertwining and complementary relationships with each other. Figure 1.1 shows some of the more important linkages among the topics.

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