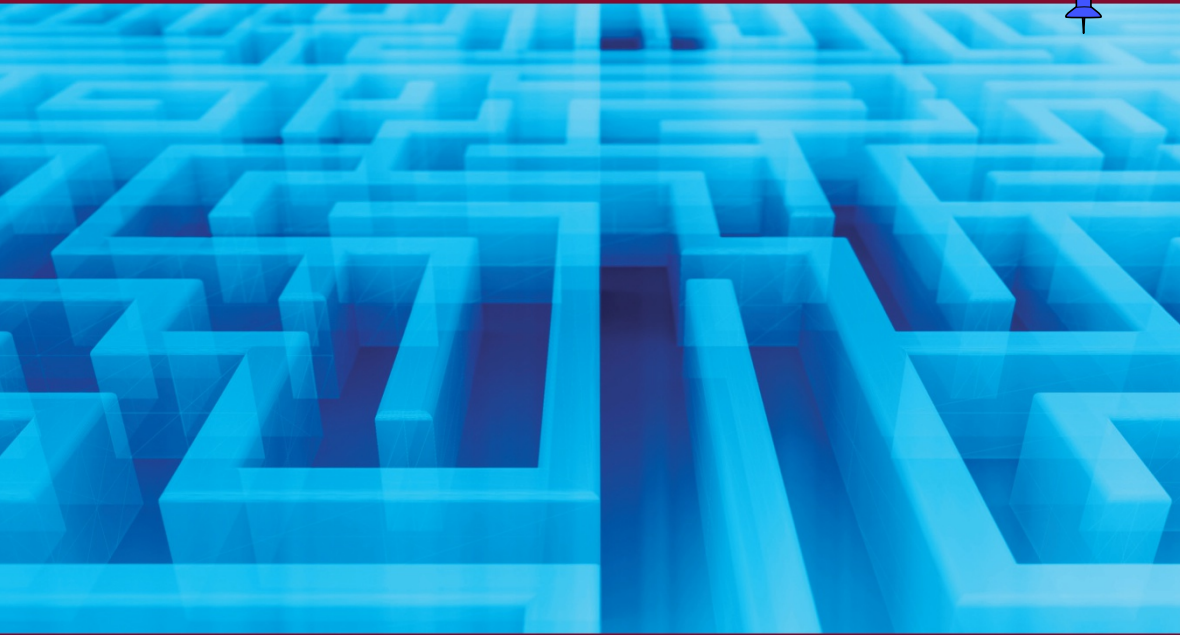


INFORMATION SYSTEMS, WEB AND PERVASIVE COMPUTING SERIES



Decision-making in Crisis Situations

*Research and Innovation
for Optimal Training*

**Edited by
Sophie Sauvagnargues**

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Decision-making in Crisis Situations

Series Editor
Jean-Charles Pomerol

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Introduction

Whether environmental, economic, social, health or humanitarian, a crisis is a complex phenomenon that requires a management strategy specific to each situation. A crisis arises after a sudden and unexpected triggering event, and is characterized by rapid changes that require optimal cooperation between various participants who are faced with a stressful situation. How the crisis is managed impacts how it unfolds.

It is therefore a matter of anticipating events and making decisions, most of which are urgent and crucial, and may need to be made on the basis of contradictory requirements, while facing a context of structural disruption. The complexities of managing a crisis situation can be seen as “a set of factors aimed at combating crises and reducing the actual damage suffered, while aiming to prevent or mitigate the negative effects of the crisis and protect the organisation, managers and/or the industrialist” (Coombs *et al.* 2010).

Decisions are made at different levels: the *strategic level* corresponds to the description of the aims and objectives set in order to deal with the crisis and concerns the decision-making structures; the *tactical level* is linked to the organization of field operations with a view to implementing the strategies drawn up; and the *operational level* executes and implements the resources relating to the organization of field operations. The crisis unit is thus the central

instrument in the strategic management of the crisis, essential to any organization. It is both an open place because it is at the crossroads of information and its processing and decision-making, and a closed place which must allow the cell to function without disruption (Heiderich 2010).

In the field of major risks, a strategic crisis unit can be municipal, departmental, prefectural, national or that of an industrial company. It unites human resources, computing and communication resources, individual or collective equipment and specific documentation relating to emergency management.

The realization of the missions assigned to a crisis unit, and anticipating and making decisions, requires a multitude of competences. Flück's model (Flück 2001) proposes four types of combined skills to react to the different professional situations encountered: technical skills (theoretical knowledge and trades, methods and tools, rules and procedures, know-how linked to experience), organizational skills (spatio-temporal organization and management of information flows), relational and social skills (oral and written expression skills, interpersonal skills, managerial and network skills) and adaptation skills (ability to adjust to the situation and its evolution over time and to transfer acquired know-how).

The acquisition and preservation of these skills is complex, all the more so when, outside of a crisis situation, it is not the main goal or function of the people concerned. The crisis unit is subject to high levels of stress as well as to various biases impacting its members in their representation and decision-making. The difficulties encountered by decision-makers in crisis cells in terms of decision-making and collective behavior necessitate training exercises to prepare them to face this type of situation. "The implementation of simulation exercises, the development of crisis scenarios outside the framework, the coordination of an even greater number of actors as well as a real line of conduct for crisis units, priorities in crisis management and in particular in terms of training are at the heart of concerns" (Lagadec 2012).

The purpose of this book is to specifically focus on decision-making training through crisis simulation. The aim is essentially educational, methodological and practical, and provides a concise review of the major knowledge, methods and innovative tools in this field.

This book is composed of eight chapters:

– The first chapter, “Concepts, Tools and Methods for Crisis Management Training”, provides an overview of the problem of crisis management training. The authors present the characteristics of the crisis unit before discussing the various aspects of crisis management training, including stress simulations, in detail.

– The second chapter, “Towards A Serious Game Within the Frame of Major Crisis Simulations for Decision-makers: How Do We Connect the DOTs?”, proposes the development of a semi-virtual training environment to ensure effective learning, mainly through improved experience, engagement and immersion, and realism. Degrees Of Training (DOTs) are organized into general, intermediate and specific skills to be involved in each crisis scenario.

– The third chapter, “Improving Crisis Exercises and Managers’ Skills through the Development of Scenario Design”, discusses the interest in improving the scripting phase of an exercise model in order to improve crisis management training and experiential learning.

– The fourth chapter, “Elaboration of Tools to Facilitate the Scenario Development of Crisis Management Training”, discusses how to develop a scenario which is credible, educational and interactive, so as to encourage trainees to be immersed in a situation which seems realistic and that allows them to acquire knowledge, skills and experience.

– The fifth chapter, “How Can We Evaluate the Participants of a Crisis Management Training Exercise”, presents an innovative methodology of evaluation and debriefing facilitation, resulting from the observation of the limits of the current training in evaluation and debriefing.

– The sixth chapter, “Managing the Game Within Crisis Exercises”, focuses on the playful dynamics at work when a group of trainees agree to consider seriously, for a few hours, that they will together role-play a virtual crisis situation. It particularly takes into account the key components of Ludicity, the manifestations of Ludicity, and how to manage Ludicity.

– The seventh chapter, “Digital Training for Authorities: What is the Best Way to Communicate During a Crisis?”, proposes to standardize some of the analyses performed on crisis management to produce a comprehensive report on the quality of the crisis communication delivered. This report may be produced following a real situation or during an emergency response drill.

– Finally, the eighth chapter, “Some Perspectives Moving Forward”, offers perspectives and development paths, in terms of realistic simulation of crisis scenarios and optimization of the didactic processes involved and of the tools implemented.

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Concepts, Tools and Methods for Crisis Management Training

The purpose of this chapter is to provide an overview of the field of crisis management training. As a first step, the descriptive elements of the crisis unit will make it possible to delineate the characteristics of this top decision-making place. Then, the different aspects of crisis management training will be addressed, before thoroughly introducing the concept of crisis simulations, which are one of the specific forms that trainings may adopt. Simulations are built and characterized by scenarios which materialize the training goals and educational content and thus favor a relevant organizational learning process. Finally, in order to illustrate the overview of this problem, we will portray the simulation and research platform of the French Institute of Risk Sciences (IMT Mines Alès).

1.1. The crisis unit at the heart of the process

The crisis team reunites decision makers who face a critical situation in a single place.

A crisis unit can be defined as a team with strong organizational integration (Sundstrom *et al.* 1990), in which different roles and

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responsibilities are finely structured (Salas *et al.* 1992) and hierarchized (Ahlstrom *et al.* 2000; Vraie *et al.* 2010). The members of the crisis unit are mobilized because of their skills and knowledge, and share a frame of reference and procedures (Ahlström *et al.* 2000) in order to accomplish the missions entrusted to them (Lachtar 2012). Considering that the activation of a crisis unit depends on the occurrence of an event requiring its mobilization, it is actually an ephemeral organization (Dautun and Lacroix 2013; MAEE 2017).

This top decision-making place, which, by definition, must suddenly be ready for operations, can quickly assume the features of a bunker, in order to accomplish its function for centralizing the various members of the organization (Maisonneuve 2010). However, it is essential that its members do not perceive the crisis room as a bunker (Lagadec 1995, 2012), so as to avoid the harmful effects of confinement on the decision-making process.

Human behavior, whether individual or collective, is at the core of a crisis unit's life (Guzzo *et al.* 1995; Marks *et al.* 2001; Weil *et al.* 2004; Hussain *et al.* 2007). Beyond the achievement of specific tasks, behavioral processes occupy a prominent place in the functioning of the crisis unit (Shanahan *et al.* 2007), particularly in regard to coordination, cooperation and communication mechanisms between members. In an emergency, the decision-making process is complex because the crisis unit is exposed to high levels of stress (highly challenging decisions, hierarchical or media pressure, etc.), as well as different prejudices, which may have an impact on its members, their representations and their decisions. During the acute phase of a crisis, it seems that policymakers prefer procedural (Crichton 2000; O'Connor and Dea 2007; Lagadec 2012), intuitive (Klein 1997; Lagadec and Guilhou 2002a,b) and creative (Crichton 2000; O'Connor and Dea 2007) decision-making, in the measure that their experience and the unpredictability of the crisis increase (Lapierre 2016).

Therefore, training exercises can prepare crisis unit decision makers for the complexity of these unstable universes, and help them to deal with the obstacles encountered during a critical situation,

regardless of whether these are individual difficulties or collective dysfunctions.

Collective dysfunctions mainly concern the transmission of information within the crisis unit, as well as among the actors involved, particularly on how they understand the situation and cope with stress and organizational aspects. They have a direct impact on decision-making and an indirect one on the whole of the organization. These dysfunctions can be classified according to the categories presented in Table 1.1.

Problems related to the transmission of information	References
Weak information sharing	King <i>et al.</i> (2008)
Improper information transmission: omissions, inaccuracies, lack of clarity, etc.	Crichton and Flin (2004), Guarnieri <i>et al.</i> (2016), Guarnieri <i>et al.</i> (2015)
Selectivity in the information chosen, oversight of other relevant data	Kowalski-Trakofler and Vaught (2003), Guarnieri <i>et al.</i> (2015)
Lack of validation, decision control	Guarnieri <i>et al.</i> (2015)
Dysfunctions related to the situation	
Insufficient knowledge about the event and the stakes involved	Dautun (2007)
Difficulty to obtain a common operating picture, a common mental representation	Seppänen <i>et al.</i> (2013), Lagadec (2015)
Collapse of sense (“sense-making”)	Weick (1995)
Control fantasy	Kouabenan <i>et al.</i> (2006)
Misrepresentation of risk, normalization of deviance	Vaughan (1996)
Effects of “groupthink” on the crisis unit	Guarnieri <i>et al.</i> (2015)
Lack of perspective on the situation	Lagadec and Guilhou (2002a,b)
Negation of the unexpected	Lagadec (2012)
Inadequate or erroneous assessment of the situation	Crichton and Flin (2004), Guarnieri <i>et al.</i> (2015), Orasanu (2010)

Misunderstanding in the face of inconsistent, inadequate or unfeasible demands	Guarnieri <i>et al.</i> (2015)
Dysfunctions related to stress	
Denial, voluntary blindness, negation of the unexpected	Kouabenan <i>et al.</i> (2006), Lagadec (2010), Heiderich (2010), Lagadec (2012)
Blocking action, ineffective processing of information	Kouabenan <i>et al.</i> (2006), Combalbert and Delbecque (2012)
Feeling of invulnerability	Kouabenan <i>et al.</i> (2006)
Consternation	Crocq <i>et al.</i> (2009)
Disorientation of members	Heiderich (2010)
Decrease in alertness and memory capabilities	Kontogiannis and Kossivelou (1999)
Need to find/appoint leaders, instead of becoming involved	Wybo (2009)
Ignorance, beliefs, ideology, arrogance and intellectual misrepresentation	Lagadec (2010), Heiderich (2010), Lagadec (2012)
Organizational dysfunctions	
Partial implementation or difficulty of setting up the cell	Dautun (2007)
Lack of available resources	Guarnieri <i>et al.</i> (2015)
Lack of reflexes, or bad reflexes	Suchet (2015)
Ambiguity of roles	Moulin (2014)
Incorrect distribution of tasks, lack of (or bad pooling of) resources	Kanki (2010)
Blind endorsement or misapplication of procedures	Crichton and Flin (2004), Lagadec (2012)
Weak leadership	Kanki (2010), Moulin (2014)
Disobedience to the leader	Guarnieri <i>et al.</i> (2015)
Tensions, conflicts, lack of cohesion	Van Vliet and van Amelsfoort (2008), Argillos (2004)
Lack of consensus	Denis (1993)

Collapse or lack of coordination devices	Weick (1995), Lagadec (2012), Kim <i>et al.</i> (2015), Smith and Dowell (2000)
Lack of support from the leaders, excessive hierarchical pressure	Guarnieri <i>et al.</i> (2015)
Lack of deep personal knowledge and of other players	Moulin (2014)
Isolation and confinement of crisis unit members	Guarnieri <i>et al.</i> (2015)
Lack of adaptability, difficulty to innovate, improvise or reorganize oneself	Edmond (2011), Autissier <i>et al.</i> (2012)
Lack of anticipation	Lagadec and Guilhou (2002a,b)
Dysfunctions associated with external crisis communication	
Absence or lack of external communication to the cell	Lagadec (1995)
Difficult or inappropriate communication with the outside	Dautun (2007); Kim <i>et al.</i> (2015)

Table 1.1. *Collective dysfunctions that may emerge at the crisis unit (according to Lapierre (2016) and Limousin (2017))*

These difficulties and shortcomings show the importance of the human factor for crisis management. On the other hand, during critical situations, managers are confronted with other complications such as the lack of technical or human resources (Lagadec 2010, Guarnieri *et al.* 2016), incompleteness, the lack of updates and the inadequacy of emergency plans to face the situation (Dautun 2007; Cesta *et al.* 2014).

All of these elements have a hindering effect on the adequate management of a critical situation. Hence, there is a need for upstream training in order to avoid them, or at least to reduce their potential consequences.

1.2. Training for crisis units

In order to prepare the crisis tool and make it efficient, it is necessary to raise awareness about it, test it out and constantly improve it (Solucom 2014).

Training sessions in the field of major risk and crisis management are essential for the actors involved in the crisis. Training comprises all of the theoretical lessons (learning) and drills (practicing) that make it possible to prepare oneself and to perfect one's skills (Quinton 2007). Training also contributes to increasing the readiness level of managers and highlights the functional, technical and organizational problems inherent in crisis management (Renaudin and Altemaire 2007).

Training sessions may cover several objectives, in particular to:

- test documentation, plans, procedures and the operational capability of crisis management tools (Gaultier *et al.* 2012);
- highlight dysfunctions and the areas to be improved (Heiderich 2010);
- encourage the crisis members to gain experience (Sayegh *et al.* 2004; Tissigton and Flin 2005);
- test the efficiency of mobilized staff (Gaultier-Gaillard *et al.* 2012);
- raise the level of expertise of the actors involved (Crichton 2001).

The skills that should be developed by managers are manifold. On another note, the dysfunctions previously identified in the crisis units highlight the need to insist on several criteria during the training sessions:

- Reflection in the middle of an emergency: an emergency is typical during the acute phase of a crisis; therefore, it must be integrated in training scenarios. It is necessary to generate stressful situations within the frame of exercise scenarios in view of imposing quick thinking to decision makers while destabilizing their organization.