Using Scenarios to Develop Crisis Managers: Applications of Scenario Planning and Scenario-Based Training

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The problem and the solution. Since the events of September 11, 2001, and Hurricane Katrina during the summer of 2005, the words crisis and disaster evoke images of families stranded on causeways turned islands, surrounded by what little property they could carry; houses smashed by killing winds; and skyscrapers crumbling out of the sky. Disastrous events, such as fires, tornadoes, hurricanes, terrorist incidents, and chemical spills, cause the loss of resources, destruction of property, financial hardship, and death. During these events, local, state, and federal governments commit large numbers of resources, time, and money to mitigate the consequences of the disaster. To manage the response to these events, leaders of public safety organizations and agencies such as fire and police departments, emergency medical services, and health-care organizations, public works departments, private industry, and nongovernmental organizations (NGOs) descend on the disaster site. These leaders are required to make high consequence decisions with incomplete or inaccurate information, ill-defined goals, and the pressures of time and a constantly changing situation by drawing on their training and experience. This article positions scenario planning and scenario-based training as two cutting-edge methods for organizational leaders to understand better their environments so as to avoid disastrous events and to put in place efficient and effective plans for coping if disaster should strike.

Keywords: *crisis management; scenario planning; scenario-based training*

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Corporate scandals, terrorism, mechanical failures, and natural disasters have caused catastrophic damage to public and private organizations resulting in losses of billions of dollars (Mitroff, 2002; Roberts, 2006; Townsend, 2006). Preparing crisis managers to be effective decision makers in crises, regardless of the magnitude, requires comprehensive and coordinated planning and training (Klein, 1999; Lindell et al., 2007). Emergency responders make decisions in the mitigation of a disaster with the benefit of intensive prior planning and rigorous, comprehensive training (Lindell et al., 2007; Montgomery, Lipshitz, & Brehmer, 2005). In fact, emergency managers develop detailed, comprehensive plans to aid decision makers as they lead emergency response efforts (Emergency Planning and Community Right-to-Know Act [EPCRA], 1986; Lindell et al., 2007; Lindell & Perry, 1992). In addition, the decision makers who lead these efforts participate in intensive training sessions and exercises to prepare them for their tasks.

Statement of the Problem and Research Question

The problem is clear: Leaders of organizations and agencies of all kinds are struggling in highly complex environments, and more than ever, they need effective methods for (a) minimizing the risk of a crisis and (b) managing crisis should it develop. Thus, the overarching research question that forms the basis of this article is What are the cutting-edge methods for avoiding and managing crisis?

This article proceeds by clearly defining disasters and crises. Once these terms are clarified, two cutting-edge methods for avoiding and managing crisis are proposed: (a) scenario planning and (b) scenario-based training (SBT). Using case study research (Dooley, 2002), these methods are discussed in the context of two recent, well-known examples of crisis in the United States, namely, (a) the events of September 11, 2001, and (b) Hurricane Katrina. Key reasons for failure are proposed in these cases based on our analyses. Conclusions for how scenario planning and SBT can aid in various forms of disaster and crisis management are provided as well as implications for research, theory, and practice.

Defining and Understanding Disasters and Crises

In emergency disciplines, multiple definitions of disaster are found in federal regulations and law, state laws, and local ordinances, typically for the purposes of enabling response and recovery efforts (Robert T. Stafford Disaster Relief and Emergency Assistance Act, 2007). However, Lindell et al. (2007) provide a comprehensive definition by stating that a disaster is “an event that produces greater losses than a community can control, including casualties, property damage, and significant environmental damage” (p. 549). For a wider

organizational context, we define disaster to mean an event that causes greater losses than the organization can handle, including personnel and financial losses, the loss of property, and irreparable damage to the organizational culture.

In studying this definition of disaster, it may seem that planning efforts are futile because a disaster, by its very nature, is more than an organization can handle, regardless of any planning efforts. However, this is not true. Although Mitroff and Alpasian (2003) state that "in today's world, it is no longer sufficient to plan for the occurrence of individual crises . . . such plans sit on the shelves and are not rehearsed until necessary. By that time, it is often too late" (p. 18), we suggest that the planning process provides more than a plan. Chermack (2004) supported this position by asserting that scenario planning can break the constraints of bounded rationality (Simon, 1990), by empowering the individuals to be more open to multiple perspectives, help individuals and organizations cope better with complexity, and provide a context that frames the experienced events. More importantly, Mitroff and Alpasian (2003) contended that

> the fact that we cannot, and never will be able to, prevent all crises from occurring does not relieve us from the moral responsibility of doing everything that we can do to make their occurrence less likely and of less impact. (p. 19)

Therefore, planning for a disaster is not futile; it is also not the whole solution (Chermack, 2004; Mitroff & Alpasian, 2003). Ultimately, planning provides more experience to build the decision-making capabilities of the individual and the organization (Klein, 1999, 2004).

In contrast to disaster, a crisis has been defined as "a decisive or critical moment" (*Merriam-Webster's Dictionary*, 2005). Other references define crisis as "an unstable or crucial time or state of affairs in which a decisive change is impending; especially one with the distinct possibility of a highly undesirable outcome" (*Encyclopedia Britannica Online*, 2007). Crisis management literature provides us with diverse meanings for crisis. Reilly (1998) defined crisis as

> A situation which is harmful and disruptive (versus a turning point or an opportunity); is of high magnitude (versus a threat or a problem); is sudden, acute, and demands a timely response (versus decline); and is outside the firm's typical operating frameworks (versus routine, such as fire to firefighters). (p. 284)

Pearson and Clair (1998) provided a more appropriate definition: "An organizational crisis is a low-probability, high-impact event that threatens the viability of the organization and is characterized by ambiguity of cause, effect, and means of resolution, as well as by a belief that decisions must be made swiftly" (p. 60). Pearson and Clair's (1998) definition provides greater flexibility in how we think about crisis because Reilly (1998) asserted that the situation is harmful and disruptive as opposed to one that threatens the viability.

In other words, not all crises are harmful and disruptive (Boin, Kofman-Bos, & Overdijk, 2004; Borodzicz & van Haperen, 2002). We submit that only the magnitude of the event separates disaster from crisis. Mitroff (2002) supports our assertion by suggesting that crises represent the breakdown of complex systems whereas disasters represent the breakup of those systems. Mitroff (2002) infers that "normal accidents" are inadvertent and should be expected because we operate "exceedingly complex technologies and systems with management and safety systems that are faulty or simply inadequate" (p. 19). These accidents represent a "shift . . . from safe to unsafe conditions" (Mitroff, 2002, p. 20), whereas incidents such as the World Trade Center and the ENRON collapse were "intentional" (p. 19) and represented "the shift from good to evil" (p. 20). Although the metaphysical approach is dramatic, it does provide a distinct difference in magnitude.

Conditions are similar in both a crisis and a disaster. High consequence decisions are required to be made in spite of a constantly changing situation, incomplete or inaccurate information, ill-defined goals, and the pressures of time (Klein, 1999, 2004; Mitroff, 2002; Reilly, 1998). Those making decisions are organizational leaders who must draw on their training and experience (Klein, 1999, 2004). Unfortunately and all too often, these decision makers are ineffective and ultimately their efforts to manage the crisis are inefficient (Klein, 1999). In this article, we address why we believe this failure in decision making occurs by reviewing two cases from emergency response disciplines.

Cutting-Edge Methods for Understanding the Environment and Managing Contingencies

Human resource development (HRD) is a discipline concerned with the development of expertise (Swanson, 2007), and increasingly, the development of communities and nations (Lynham & Cunningham, 2006; McLean, 2004). Based on expertise in adult learning, and by using this expertise in a context in which learning is considered the most appropriate approach to strategy (de Geus, 1988, 1999), HRD is poised to play a significant role in minimizing the risk of, and recovery from, crisis situations. HRD professionals are beginning to demonstrate their planning expertise in corporate (Chermack & van der Merwe, 2003), nonprofit (Chermack, van der Merwe, & Lynham, 2007), and national contexts (Lynham & Cunningham, 2006). (For a detailed outline of how HRD professionals encourage, engage, and increasingly drive organization strategy through scenario-based planning, see Bartlett & Ghoshal [2002], Chermack [2004], Yorks [2004], and Walton [1999].)

Two tools that have a track record of success in practice are scenario planning and SBT (Bloom & Menefee, 1994; Lynch, 2005; O'Reilly & Brandenburg, 2006; Schwartz, 1991). These methods allow disaster and crisis response workers to evaluate multiple potential outcomes of volatile situations

and consider a variety of responses, aiming for the most efficient and effective of both. Scenario planning has been defined as

> a process of positing several informed, plausible and imagined alternative future environments in which decisions about the future may be played out, for the purpose of changing current thinking, improving decision making, enhancing human and organization learning and improving performance. (Chermack & Lynham, 2002, p. 376)

This definition has been used with considerable success, with widely documented cases (Kahane, 1992; Wack, 1985a). SBT (operating at a more detailed level concerning what action to take given the unfolding of a specific scenario, and then using that plan to train responders to execute the response efficiently) has long been in use in varying emergency response professions including wilderness search and rescue teams, firefighters, law enforcement teams, and many others with success (Jenvald & Morin, 2004; Lynch, 2005; Mirabella & Macpherson, 1995; O'Reilly & Brandenburg, 2006; Strohschneider & Gerdes, 2004; Whitcomb, 1999).

To clarify, scenario planning explores the potential realities whereas SBT provides the opportunity to experience interaction within the potential reality to develop and test possible solutions to the problems presented. Each of these tools warrants further description and clarification.

Scenario Planning

Scenario planning evolved from Herman Kahn's methods to "think the unthinkable" (Kahn & Wiener, 1967) in the 1950s. The scenario approach recognizes the inherent weaknesses in forecasts, and single-outcome methods that essentially aim to predict the future. Instead, scenario planning makes use of multiple scenarios or stories of different futures to underscore the fact that the future is unpredictable, unstable, and inherently filled with uncertainty. Reframed as tools for learning, scenarios are intended to "shift the thinking inside the organization" (Wack, 1985a, p. 34) and help managers and decision makers reperceive the organizational situation and consider numerous ways in which the future might unfold.

Pierre Wack translated Kahn's ideas into a corporate setting in his years as the head of long-range planning at Royal Dutch/Shell. Wack spent most of the 1970s experimenting with and refining his methods and he credited Shell's ability to anticipate the oil shocks of the mid-1970s and 1980s to this new technique. Eventually, he published Shell's successes with scenarios in the *Harvard Business Review* (Wack, 1985a, 1985b). Wack's work at Shell served as the foundation for the modern scenario planning methods used and sold through the Global Business Network (www.gbn.org)—the organization most commonly sought for expertise in scenario practices today.

A General Scenario Planning Process

Although there are numerous variations on how to conduct a scenario planning exercise, all are variations on a theme. That is, all have certain elements in common. Wilson and Ralston (2006) provided a comprehensive and detailed process for developing and using scenarios. Their process involves 18 steps, which are provided in Table 1. Each step in this process is a critical point of adding value and exposing mental models and assumptions during the scenario project. These 18 steps are also in four general phases of scenario planning, namely, (a) "getting started, (b) laying the environmental analysis foundation, (c) creating the scenarios, and (d) moving from scenarios to a decision" (Wilson & Ralston, 2006, p. 25).

Steps 1-6 are all related to starting up the scenario project, and these steps are meant to define the scope of the project and assemble the scenario project team. Steps 7-10 are concerned with exploring the internal and external environments and putting these together in a cohesive picture. Steps 11-14 focus on developing the scenarios themselves based on all of the work done in the previous steps. The final phase includes steps 15-18 that cover the use of the scenarios to examine current strategies and decisions. Wilson and Ralston's (2006) text provides a detailed road map through each of these steps with specific instructions and practitioner tips.

SBT

SBT is a training method that provides a context in which individuals and groups can experience and interact with a possible future (Funke, 1998; Hermann, 1997; Jenvald & Morin, 2004; Kirkley & Kirkley, 2005; Mirabella & Macpherson, 1995; Smith, 2004; Strohschneider & Gerdes, 2004; Whitcomb, 1999; Yusko & Goldstein, 1997). SBT presents learners with an interactive story and places them in a specific environment that resembles the context in which the problem would typically be encountered (i.e., work environment). The story is reactive to the actions of the participants. Through the story and the environment, learners are presented a problem or a series of problems at specific points in the story that flow logically throughout, called decision points (Whitcomb, 1999). The story and corresponding decision points are developed to stimulate specific learning outcomes (Lynch, 2005). The decision points are arranged in a specific order and frequency to increase or decrease the complexity of the given problem.

SBT is a versatile training method that can be used to reinforce classroom lectures on a single topic to providing an environment to hone command and control skills and enhance decision-making skills (Moats, Hightower, Ware, & Wall, 2004; Texas Engineering Extension Service [TEEX], 2005; Whitcomb, 1999) to providing integrated scenarios that can be used as a comprehensive evaluation of skills (Babicz, 2003; Lebow & Wager, 1994; Lynch, 2005; Whitcomb, 1999). The method has been in practice for many years

TABLE 1: A Step-by-Step Approach to Developing and Using Scenarios

Step 1: Develop the case for scenarios	Step 10: Conduct focused research on key issues, forces, and drivers
Step 2: Gain executive understanding, support, and participation	Step 11: Assess the importance and uncertainty of forces and drivers
Step 3: Define the decision focus	Step 12: Identify key "axes of uncertainty"
Step 4: Design the process	Step 13: Select scenario logics to cover the "envelope of uncertainty"
Step 5: Select the facilitator	Step 14: Write the story lines for the scenarios
Step 6: Form the scenario team	Step 15: Rehearse the future with scenarios
Step 7: Gather available data, views, and projections	Step 16: Get to the decision recommendations
Step 8: Identify and assess key decision factors	Step 17: Identify signposts to monitor
Step 9: Identify the critical forces and drivers	Step 18: Communicate the results to the organization

Source: Wilson and Ralston (2006, p. 25). Copyright 2006 Southwestern Educational.

(Whitcomb, 1999) and combines techniques and processes from theater, storytelling, and training, often mixed with computer-based simulations (Boin et al., 2004; Borodzicz & van Haperen, 2002; Diehl, 1991; Funke, 1998; Hermann, 1997; Whitcomb, 1999). However, there has not been any significant empirical study of the topic, although it is widely assumed that this is an effective method of training (O'Reilly & Brandenburg, 2006). SBT is a technique that is supported by experiential learning theory (Kolb, 1984; Kolb, Rubin, & McIntyre, 1983), transformational learning theory (Cranton, 2002; Mezirow, 1991, 1994, 1997; Taylor, 1997) and many principles of naturalistic decision making (Alby & Zucchermaglio, 2006; Gore, Banks, Millward, & Kyriakidou, 2006; Klein, 1999, 2004; Klein & Calderwood, 1990; Lipshitz, Klein, & Carroll, 2006; Montgomery et al., 2005). In addition, some SBT applications also use computer-based simulations to provide a level of fidelity (realism) (Boin et al., 2004; Borodzicz, 2004; Borodzicz & van Haperen, 2002; Dugdale, Pallamin, & Pavard, 2006; Helsloot, 2005; Hermann, 1997; Issenberg, Gordon, Gordon, & Safford, 2001; Jenvald & Morin, 2004; Mirabella & Macpherson, 1995; O'Reilly & Brandenburg, 2006; Smith, 2004; Strohschneider & Gerdes, 2004; Yusko & Goldstein, 1997).

A Common SBT Process

There are many accepted ways to develop, execute, and revise SBT applications. Figure 1 shows the most common elements of the SBT methodology

grouped into three main stages: (a) scenario development, (b) delivery, and (c) after action review(s) (Babicz, 2003; Borodzicz, 2004; Borodzicz & van Haperen, 2002; Jenvald & Morin, 2004; Kirkley & Kirkley, 2005; Lynch, 2005; Mirabella & Macpherson, 1995; Whitcomb, 1999). The first stage, scenario development, begins with determining the scope and intent of the training. An ill-prepared or inappropriate scenario can result in huge transfer distances and negative learning (Holton, Bates, & Ruona, 2000). The use of an appropriate scenario can provide the participant a small transfer distance and make it much easier to utilize the knowledge and skills acquired in a number of applications. Fidelity plays a large role in lessening this distance (Holton et al., 2000; O'Reilly & Brandenburg, 2006). During this first phase of scenario development, the scope of the scenario and the most appropriate context is determined (Noe, 2005). The learning objectives should be oriented to define expected task performance, outline the conditions in which the outcomes should take place, and define the criteria that describes to what level of accuracy and what level of proficiency the activity is to be performed (O'Reilly & Brandenburg, 2006). The scenarios should reinforce the learning objectives and ensure there is an opportunity for each objective to be met. To illustrate this point, Smith (2004) wrote: "Any scenario has to be grounded in the realities of the organization but sufficiently challenging to expose gaps in the knowledge base of those managers in the various crisis teams" (p. 356).

Once the objectives are determined, the second phase of scenario development incorporates a process such as scenario planning to develop the detailed storyline and decision points of the scenario. This process is one of the most critical in the development of SBT. The development of the scenario should be done by a comprehensive committee that has the necessary knowledge to develop a logical and appropriate storyline. Whitcomb (1999) stated, "The committee should be diverse enough to reflect disparate training interests and broad enough to address all core competencies" (p. 44). Whitcomb (1999) added that the committee should be led by someone who fully understands the training objectives and intent of the mission to make the appropriate decisions concerning the details of the scenario and the logic that supports it.

Once the detailed storyline has been developed with the integrated decision points, extensive and detailed care should be taken to develop scripts and actions consistent with the storyline (Lynch, 2005). These scripts and actions are essential to building the fidelity, or realism, of the scenarios. If these scripts are unrealistic or flawed, they have the potential to inhibit or interrupt the learning process (Lebow & Wager, 1994). In addition to the scenario, the context of the training is equally important to the fidelity of the training (Lynch, 2005; Whitcomb, 1999).

The aesthetic value, in essence, the look and feel of the training environment, including props, equipment, and the facility, has obvious value to the context. However, safety and logistical concerns, such as the appropriate number of instructors, actors, and coordination specialists, are important to

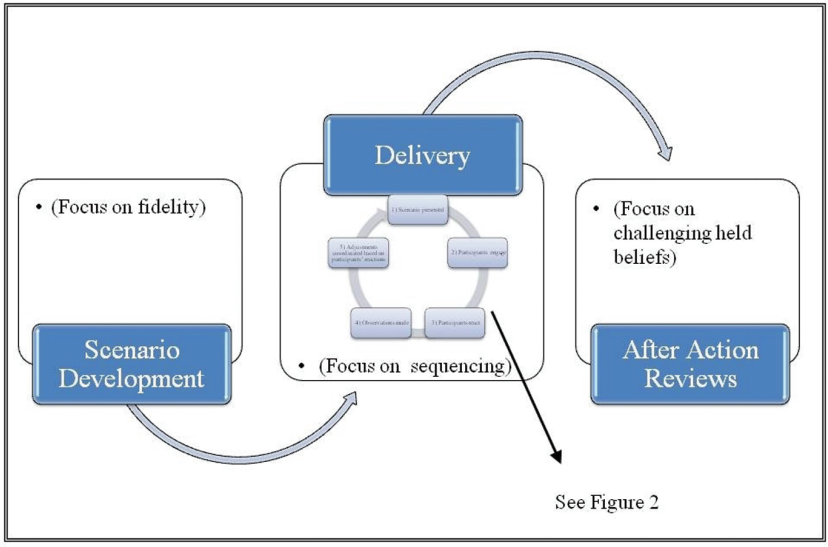

FIGURE 1: General Model of Scenario-Based Training

maintaining the illusion of realism (Lynch, 2005; Whitcomb, 1999). These logistical concerns must be addressed before advancing to the next stage of SBT, delivery of the training.

During the delivery of the training, a subprocess supports the larger training process. Figure 2 illustrates the subprocess of this stage. First, the scenario is presented to the learners. They react to the scenario and their actions and reactions are observed and recorded by the observers and controllers. Observations are also used for a myriad of purposes, including the sequencing of the scenario to maintain the fidelity of the scenario and evaluation of the participants' mastery of the competencies (Whitcomb, 1999).

The scenario is then adjusted to participant reactions based on the training needs and the fidelity of the training. For example, if the intent of the training is simply familiarization with a problem, then the scenario may be much less complex and require much less detail to be observed. If the intent of the training is mastery, then the observations are likely to require more detail. Additionally, the level of coordination between the observers, controllers, actors, and coordinators is the single most important process that takes place. If this coordination fails, the fidelity of the scenario collapses (Lynch, 2005; Whitcomb, 1999).

The final stage of SBT is the debriefing. A debriefing can be defined as "a process in which people who have had an experience are led through a purposive discussion of that experience" (Lederman, 1992, p. 146). This technique is a means to provide feedback on participant performance (Jenvald & Morin,

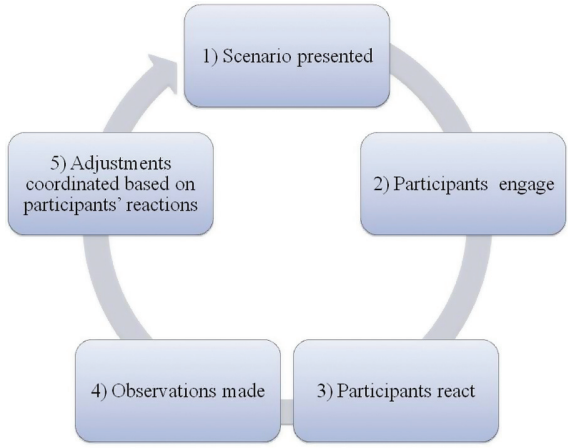

FIGURE 2: The Delivery Component of Scenario-Based Training

2004), to bring learners to connect the dots from the old knowledge and skills they have, and to provide learners opportunities to apply new knowledge and skills. Carefully planned debriefings can help minimize the weaknesses caused by problems with fidelity, whether they occur because of a poor scenario or other unavoidable problems to manage the sense of reality (Diehl, 1991).

The debriefing is led by an instructor and provides participants the opportunity to review the actions of the course and ultimately change their worldview and individually held paradigms (Ellis, Mendel, & Nir, 2006; Lederman, 1992). These guided reflections, and ultimately SBT, rely heavily on what Mezirow (1994, 2003; Mezirow & Associates, 1990) refers to as "discourse." Discourse refers to a special type of dialogue that involves the introspective assessment of one's held "beliefs, feelings and values" (Mezirow, 2003, p. 59). The after action review portion of SBT provides the opportunity to make good use of dialogue as a mediating process. Lederman (1992) states that this process "is not ancillary to the educational process . . . [it] is an integral part of any learning experience" (p. 158).

Case Study Research

Dooley (2002) described case study research in a manner that demonstrated its flexibility and that is used to structure the remainder of this article. Based on a clear analysis of other authors on the topic (Soy, 1996; Stake, 1994; Yin, 1981, 1994), Dooley (2002) synthesized the following elements of case study research:

- determine and define the research questions,
- select case(s) and determine the data gathering and analysis techniques,
- prepare to collect data,
- collect data in the field,
- present and analyze the data,
- prepare the report. (Pp. 338-339)

These components of case study research were used in the definition and selection of two cases in which we illustrate the two key contributing factors that led to recent well-known disaster and crisis situations. The cases selected to demonstrate failure in the effective management of crises include the events of September 11, 2001, focusing specifically on the incident in New York City, and Hurricane Katrina, focusing specifically on New Orleans and the immediate surrounding area. Both of these events involve situations in which a failure to seriously consider action plans based on possible outcomes and a proper allocation of resources led to even further chaos.

Defining the Problem and Research Question

Events such as the terrorist attacks on September 11, 2001, and Hurricane Katrina are examples of crises that challenge organizations as well as change forever the social, political, and economic environments (Mitroff, 2002). Events such as these pose serious questions to people interested in planning as they provide clear examples of the consequences of misreading actions and their potential outcomes. For clarity, the key problem statement and research questions are presented again as follows:

> Problem: Leaders of organizations and agencies of all kinds are struggling in highly complex environments, and more than ever, they need effective methods for (a) avoiding crisis and (b) managing crisis should it develop.
>
> Research question: What are the cutting-edge methods for avoiding and managing crisis?

Selection of the Cases and Analysis Techniques

The two cases selected to illustrate the key points of the article are (a) the events of September 11, 2001, and (b) Hurricane Katrina. These cases were selected based on their prominence in the national and global media (although these are both examples based in the United States which is a limitation to this article) and because they feature clear examples of failure that can provide critical learning. Case reports of both of these events were obtained from the U.S. Congress, newsprint, and various other published analyses that provided guidance and various accounts of what happened and what went wrong in each case.

Preparation and Data Collection

The case reports and other documentation were obtained through the utilization of the online library system at a major research university in the southern United States and through the databases of an agency specializing in emergency response, also located in the southern United States. These events were chosen because (a) each provides an example of a series of events that is highly complex involving multiple organizations and (b) each has a myriad of information published about it from a wide variety of perspectives. Searches included the following databases: Academic Search Premier; Cambridge Scientific Abstracts, including Social Service, Management, and Organization Studies; Communication Studies and Education SAGE Full-Text Collections; Ingenta; and Emerald Insight. These databases were searched using the following keywords: World Trade Center Response; Arlington County Response; Pentagon Response; September 11, 2001; 9:11; Hurricane Katrina; Katrina; and 2005 Hurricane Season.

Analysis of the Cases

This section describes an analysis of the two cases, centering on two key issues that ran through both cases. These were (a) a lack of vision in considering the possible outcomes and (b) a lack of action once the crises began to unfold. These issues are described in each case with particular attention to evidence gleaned from reports and publications concerning each event.

Lack of vision—planning failures. Mitroff (2005b) suggested that lack of vision and denial are two of the most powerful hindrances to effective crisis management (Wagner, 2005). Organizations often engage in multiple approaches to planning (Chermack, Lynham, & Ruona, 2001; Lindell & Perry, 1992; Mintzberg, 1994; Mintzberg, Ahlstrand, & Lampel, 1998). Unfortunately, plans still fail (Bloom & Menefee, 1994; Lindell & Perry, 1992). Failure occurs because planners lose perspective on an essential characteristic of a crisis; it is a low-probability event (Boin et al., 2004; Mitroff, 2002, 2005b; Pearson & Clair, 1998; Reilly, 1998; Wagner, 2005). Planners fail to imagine the possibilities beyond the most likely. Examinations of various planning tools such as the traditional SWOT (strengths, weaknesses, opportunities, threats) analysis, forecasting, and other predictive orientations toward planning reveal that most traditional approaches to planning are inadequate because they do not allow decision makers to expand their view of what is possible and may happen in the future (Bloom & Menefee, 1994; Mintzberg, 1994).

In August 2005, Hurricane Katrina, a powerful Category 4 storm devastated the central Gulf Coast region of the United States. Hundreds of square miles, including homes, commercial, and industrial areas and even whole cities were annihilated by the powerful winds and water of the hurricane. To magnify the

effects of the storm, the city of New Orleans and the surrounding parishes were flooded when the levees, which were to protect the city, failed (Townsend, 2006; U.S. Congress, 2006).

Several events surrounding Hurricane Katrina provide powerful and tragic examples of failures in the management of the crisis. However, a lack of willingness to entertain scenarios that were circulated more than a year before Hurricane Katrina's landfall provides a clear example of failure to consider the possible over the likely. In July 2004, federal, state, and local emergency planners and responders were confronted with a planning exercise that used a hurricane scenario called Hurricane PAM. The scenario had an eerie likeness to Hurricane Katrina which followed some 13 months later (U.S. Congress, 2006). The report submitted to Congress detailing the events before, during, and after Hurricane Katrina provide a concise description of the Hurricane PAM scenario (U.S. Congress, 2006).

> The Hurricane Pam scenario focused on 13 parishes in southeast Louisiana—Ascension, Assumption, Jefferson, Lafourche, Orleans, Plaquemines, St. Bernard, St. Charles, St. James, St. John, St. Tammany, Tangipahoa, and Terrebonne. Representatives from outside the primary parishes, including officials from Mississippi's Emergency Management Agency (EMA), participated because hurricane evacuation and sheltering involve communities throughout Louisiana and into Arkansas, Mississippi, and Texas. The Hurricane Pam exercise scenario was prescient. The virtual storm brought sustained winds of 120 mph, up to 20 inches of rain in parts of Southeast Louisiana, and storm surges that topped the levees and flooded the New Orleans area. The exercise assumed that:
>
> 300,000 people would not evacuate in advance;
>
> 500,000 to 600,000 buildings would be destroyed;
>
> Phone and sewer services would be knocked out and chemical plants would be flooded;
>
> 97 percent of all communications would be down;
>
> About 175,000 people would be injured, 200,000 would become sick, and more than 60,000 would be killed;
>
> About 1,000 shelters would be needed for evacuees;
>
> Boats and helicopters would be needed for thousands of rescues because many residents would be stranded by floodwaters;
>
> A catastrophic flood would leave swaths of southeast Louisiana uninhabitable for more than a year. (U.S. Congress, 2006, p. 81)

When confronted with this scenario, emergency planners denied the vision and thought it too extreme and then failed to implement many of the recommendations and lessons learned as a result of the exercise (Mitroff, 2005a; Phillips, 2006; U.S. Congress, 2006). Scenario planning was used in this situation however; the reluctance of decision makers to seriously entertain the

possibility of a disaster in New Orleans prevented them from taking the proper precautionary measures. This was a case of scenario planning in which decision makers were not compelled by the content of PAM scenario and represents both a lack of vision (in terms of a willingness to explore catastrophe as a real possibility) and denial.

However, these facts also prompt us to ask whether learning actually occurred (Phillips, 2006). Perhaps, this is an example in which no learning occurred. Or, was the knowledge gained, the learning, forgotten? We propose that the weakness in crisis management planning is a lack of vision that is adequate for the unexpected, unanticipated, and abnormal. Mitroff (2005a) supported our assertion:

> Most natural disasters, such as earthquakes, are neither predictable nor preventable. However, many, such as hurricanes and tsunamis, are somewhat predictable even if they are not fully preventable. . . . In the case of Katrina, it was thought that the probability of a hurricane of its magnitude occurring was only 0.03. . . . To his credit, Homeland Security Secretary Michael Chertoff wants to replace traditional RM [risk management] by approaches that focus on the magnitude of the consequences only. If we don't, then we will continue to downplay high consequence-low probability crises like Katrina, not to mention atrocities like 9/11. (Pp. 2-3)

On Tuesday, September 11, 2001, 19 terrorists, equipped with box cutters, hijacked four commercial aircraft flying transcontinental routes. The terrorists flew three of these planes, loaded with passengers, into the north and south towers of the World Trade Center in New York; the Pentagon, located in Arlington County, Virginia, near Washington DC; the fourth plane was crashed into an empty field near the small town of Shanksville, Pennsylvania. These tragic events transpired in little more than 60 min. These attacks marked the first time in the history of the United States that "mass, simultaneous attacks . . . of such devastating potential" (Hoffman, 2002, p. 17) were perpetrated on domestic soil. More than 2,000 people, including hundreds of emergency response personnel, perished as a result. What made this more tragic was that the planning and intelligence communities failed to recognize that an event of this type and magnitude was possible in the United States (Hoffman, 2002). The attacks on the World Trade Center and the Pentagon were well planned and executed by the terrorists (9/11 Commission, 2004). The National Commission on Terrorist Attacks upon the United States, also known as the 9/11 Commission, cited interagency communication failures, lapses within the national intelligence system and lapses of national security policies and procedures as the most significant failures that ultimately led to the terrorists' access to carry out their acts. More significantly, these failures can be traced to the inability of the planning and intelligence communities to imagine a potential reality that included an attack on the United States, let alone a coordinated, simultaneous attack on multiple targets spread over wide geographic area (Hoffman, 2002). The testimony of CIA operative recorded in the 9/11 Commission Report (2004) supports our assertion, "no one looked at the bigger picture; no analytic work foresaw the lightning that could connect the

thundercloud to the ground" (p. 297). In other words, had the vision of such an attack been understood, the attacks could have possibly been avoided.

Unfortunately, the planning failures that would have prevented or lessened the impact of September 11 were not limited to the intelligence community. The engineering and emergency response communities failed to envision and consequently plan for the possibility that the towers of the World Trade Center would collapse (Greenhom & O'Mara, Incorporated, 2002; 9/11 Commission, 2004). Emergency response planners failed to imagine the consequences if the towers, each more than 1,000 ft into the New York skyline, were to collapse. The consequences of this lack of vision allowed emergency response vehicles and personnel as well as command and control centers to locate in the collapse zone. When the buildings did fail, they literally crushed the incident response efforts.

A second failure of the planning effort existed in the inability to conceive of an event that would overwhelm the considerable resources of New York City (Hoffman, 2002; 9/11 Commission, 2004). Prior to September 11, 2001, there had been multiple large-scale incidents, such as the 1993 World Trade Center bombing; however, the complexity and magnitude of the 2001 attack made all previous incidents pale in comparison. Because the emergency response planners failed to envision any event that would overwhelm New York, the emergency responders and city government officials were lulled into a false sense of security (Hoffman, 2002) allowing the various major response agencies to remain virtually autonomous (9/11 Commission, 2004). In addition, many policy decisions were made in an attempt to resolve conflicts instead of improve the functionality of the holistic response effort (9/11 Commission, 2004). The result of this inability to vision this event was an uncoordinated, inefficient response effort (McKinsey & Company, 2002; 9/11 Commission, 2004).

Lack of ability—problem-solving failures. In the current business environment, executives and crises planners are subject to the same failures as those in emergency response organizations (Klein, 1999; Reilly, 1998). As Smith (2004) wrote, "The manager was, after all, employed because of his or her demonstrable skills in 'steady-state' management" (p. 347). The events surrounding Hurricane Katrina provide another example of a failure of crisis management. However, this is not a breakdown of imagination; it is a collapse of action—decision making. The failure to make timely decisions about a myriad of topics resulted in exacerbating the Hurricane Katrina disaster to a magnitude of the highest proportions (Townsend, 2006; U.S. Congress, 2006). The most agonizing example of this breakdown concerns the decision, or rather lack thereof, to evacuate New Orleans and the surrounding parishes (U.S. Congress, 2006).

More than 56 hr before landfall, the National Weather Service (NWS) and National Hurricane Center had provided accurate and timely predictions of the storm's path (NWS, 2006; Reston, 2005; U.S. Congress, 2006). Emergency plans, recently revised since Hurricane Ivan in 2005, also provided prompts for evacuation decisions (U.S. Congress, 2006). The information proved useful for

others under similar conditions in the states of Alabama, Mississippi, and in other areas of Louisiana. Yet, those designated to make these important decisions, including the decision of when and how to evacuate New Orleans and the surrounding parishes, delayed action while waiting for more information (Roberts, 2006; Townsend, 2006; U.S. Congress, 2006). A brief analysis of this phenomenon suggests that in a crisis, most managers experience tunnel vision resulting in the inability to mitigate the situation (Smith, 2004). This desire to wait for more information before making a decision is euphemistically referred to as *paralysis by analysis*. However, it is often very costly and in the case of Katrina, it cost many people the ultimate price (U.S. Congress, 2006).

Exercise scenarios predicted the likely impact of a severe hurricane coming ashore near New Orleans with uncanny accuracy (U.S. Congress, 2006). The crisis managers, emergency response officials, and the general public knew that Katrina's landfall was imminent (NWS, 2006; Townsend, 2006; U.S. Congress, 2006). Others in the same situation were making decisions. Yet, the decision makers in New Orleans and the surrounding parishes failed to make a decision (U.S. Congress, 2006). They failed to act because they could not determine when and how to make a decision. In other words, the problem with decision makers in crisis situations is often that they do not know how to make crisis decisions.

Similarly, the emergency response leaders' lack of experience conspired against them and ultimately led to the largest loss of responder lives in the history of the United States during the New York response to September 11 (McKinsey & Company, 2002). As stated previously, few emergency response leaders had encountered the challenges that the dynamic, highly complex, large-scale New York incident presented (McKinsey & Company, 2002). As a result of the emergency response leaders' lack of experience, the command, coordination, and control efforts collapsed when the towers collapsed and did not fully recover for several days after (McKinsey & Company, 2002; 9/11 Commission, 2004). Specifically at issue was that the response leaders failed to recognize the key indicators that the buildings were failing and were unable to recognize the communications shortfalls that existed (McKinsey & Company, 2002; 9/11 Commission, 2004).

When the towers collapsed in New York, it was estimated that 44% of the on-duty command staff for the New York Fire Department were incapacitated or killed. Additionally, the communications, logistics, and coordination infrastructure was severely damaged and rendered ineffective. These complications also contributed to the ineffectiveness of the command and control capabilities (McKinsey & Company, 2002; 9/11 Commission, 2004). The New York Fire Department lost 343 personnel, the Port Authority of New York and New Jersey Police Department lost 37 personnel, and the New York Police Department lost 23 personnel for a total of 403 emergency responders lost in the collapse of the twin towers (McKinsey & Company, 2002; 9/11 Commission, 2004)

When the September 11 New York response is compared to the September 11 Arlington County response, it becomes clear that New York suffered the most from the failures of planning and lack of experience (Hoffman, 2002; McKinsey & Company, 2002; 9/11 Commission, 2004), whereas Arlington County benefited from the successes of planning and the experience gained from routinely making calls and exercising together (J. Chinn, personal communication, May 9, 2007; Davis, 2002; Titan Systems, 2002). Although neither response was flawless, the Arlington County response was able to capitalize on the benefits of comprehensive and coordinated preincident planning and collaboration between the multiple jurisdictions that surround the Pentagon (9/11 Commission, 2004; Titan Systems, 2002). The 9/11 Commission (2004) attributes three primary reasons for the success of the Pentagon response: (a) there was a strong sense of trust among the responding agencies, (b) the institutionalization of the Incident Command System, and (c) the coordination and execution of the response at a regional level. The 9/11 Commission (2004) recognized the significance of the effect of the planning and training efforts in the final report by stating, "Many fire and police agencies that responded had *extensive prior experience* [italics added] working together on regional events and training exercises" (p. 314). In fact, many of these agencies worked cooperatively and collaboratively to develop systems and processes to solve problems. These agencies not only responded together, but they also practiced together using the scenarios that represented the worst case possibilities that they developed (J. Chinn, personal communication, May 9, 2007).

Exploring the Cases

In the case of Hurricane Katrina, scenario-planning methods were used and the possibilities of those tragedies were examined (D'arcy, O'Hanlong, Orszag, Shapiro, & Steinberg, 2006; Freidman, 2005). With Hurricane Katrina, there was not necessarily a lack of vision. However, it seems that the Hurricane PAM scenario was dismissed as too extreme and consequently given a low probability assignment (Townsend, 2006; U.S. Congress, 2006). Assigning probability estimates to scenarios is a classic pitfall in the process (Schoemaker, 1995). As soon as probabilities are assigned, naturally, the scenarios with low probabilities are dismissed and energy is focused on those with high assignments. This approach also undermines the entire purpose of scenario planning—to stretch the thinking, to expand the assumptions, and to learn about the future by taking in a variety of options.

The case of Hurricane Katrina illustrates failure in translating vision to action. Stated another way, the scenarios were either not convincing enough to warrant serious consideration by decision makers, or there was a complete breakdown in how those scenarios were used to develop contingency plans. Admittedly, the scenario planning literature is not clear about what to do with

the scenarios once they have been developed. In fact, so much focus has been placed on scenario *development* that no documented process for using scenarios to examine strategy is available. Some reference is made to a process called "windtunnelling," but again a detailed description is missing. We propose in this article that once a set of scenarios are developed, SBT may be a valuable method for translating new thinking gleaned from scenario development into action plans for responding as situations unfold.

SBT Strategies

There is no doubt that the recent events, such as September 11, 2001, and Hurricane Katrina, have heightened the organizations' awareness to increase their crisis management capability (Boin et al., 2004). Unfortunately, crisis management planning and training are happenstance and not institutionalized (Mitroff, 2005a). Certain federal initiatives, such as the National Incident Management System (U.S. Department of Homeland Security [DHS], 2004) require that some organizations included in critical infrastructure or business sectors must be trained in the incident command system (Homeland Security Act of 2002, 2002). In addition, some federal regulations, such as the EPCRA require organizations to have emergency operations plans and train select employees in emergency response procedures if they meet certain criteria, such as storing or manufacturing a specified quantity of hazardous substances. However, this requirement affects a relatively small number of organizations.

In most organizations that are not subject to federal requirements, crisis management training is typically relegated to annual employee in-service sessions or is not conducted. One reason may be that crisis management is often viewed as a "drain on profits" (Klein, 1999, p. 238). A search of the Internet shows that a significant amount of the available crisis management training is typically oriented toward emergency situations (i.e., fire, bomb threats, active shooters, etc.). Many consulting firms do provide customized crisis management training designed to meet the customers' needs. However, these programs are usually expensive (Sachs, 2007).

Emergency response organizations have a greater selection of training strategies; however, it is not optimal. Larger cities, such as New York, Dallas, Los Angeles, and Houston have their own public safety training institutions. Typically, the training offered by these institutions typically meets or exceeds national and industry standards. However, training is developed based on the needs of the organization and is typically limited to members of the organization. State agencies, such as the TEEX, the Maryland Fire Rescue Institute (MFRI), and the Kentucky Community and Technical College System (KCTCS), are designated by state legislation as state public safety–oriented training agencies. Federal departments, such as the U.S. DHS and the Department of Transportation provide training and training funds. The training may be delivered

by institutions such as the National Fire Academy (NFA) and Emergency Management Institute (EMI), located at Emmitsburg, Maryland, or by contractors, including some of the designated state training agencies. EMI and NFA offer resident courses as well as regionally and locally delivered training.

Finally, many organizations are left to design, develop, and deliver their own training for their members. These organizations supplement their training needs through using federal, state, and local monies to purchase training or take advantage of the aforementioned federally sponsored training, assuming it meets the needs of the organization. Much of this training is conducted through didactic courses with some hands-on activities to supplement the didactic portion. Some programs, such as those at TEEX's Texas Fireman's Training Center and the Center for Domestic Preparedness, provide hands-on training supplemented by didactic sections. This hands-on training includes using simulations and exercises with varying levels of fidelity and context. For example, the TEEX training area provides simulated industrial appliances, including petroleum refinery equipment props. These props can be burned to simulate a rupture and subsequent fire. However, the training is typically task oriented and focused on developing a specific skill. At the Center for Domestic Preparedness in Anniston, Alabama, participants are allowed to don chemical protective equipment and enter controlled hazardous environments where highly toxic chemical weapons are released. Again, these training activities focus on a particular task or procedure without placing trainees in the context of a situation.

Organizations use training exercises for multiorganizational training. These exercises have several derivations, and each has a particular function. The functions of the exercises range from familiarizing the participants with the specific procedures of a plan to providing participants at all levels with decision-making opportunities in the context of a crisis. In some cases, these exercises are facilitated by simulations. However, no standard of design, development, or evaluation exists beyond vague federal recommendations.

Optimal Training Strategies

We suggest that the optimal crisis management training programs must have a strategic approach. As a crisis is among other things, an unexpected event, crisis managers need to be able to understand the issues created by the situation(s) they may encounter. Moreover, crisis managers need to be capable of making decisions and cannot be shocked into decision-making paralysis (Townsend, 2006; U.S. Congress, 2006). To be effective and efficient decision makers, crisis managers, above all else, need a vast and varied experience base from which they can pull from to make decisions (Alby & Zucchermaglio, 2006; Klein, 1999; Klein & Calderwood, 1990; Montgomery et al., 2005). Once the decisions are made, the crisis manager must know how to develop and implement strategies that are capable of mitigating the presenting problems, yet flexible enough to adapt to rapidly developing changes.

Given these requirements, the optimal training strategy will include an interwoven training process that addresses the needs of the consumers. Policy makers and emergency response agency officials should collaborate to work through the scenario planning process to identify the possible future realities. In doing this, they identify many of the problems in which future policy decisions can mitigate in an informed manner, as opposed to guessing or flowing with trends (Mitroff, 2005a; Mitroff & Alpasian, 2003). However, for this to be more than an exercise in theoretical assumptions, the developed potential realities must be engaged (Lynch, 2005; Whitcomb, 1999). SBT is the perfect tool to achieve this task (Boin et al., 2004). Additionally, when crisis managers engage the scenarios, there can be manifold rewards. For example, mechanical issues such as estimates of logistical needs, time requirements, and the unavoidable conflicts that cannot otherwise be detected can be identified, engaged, and worked through (Mitroff, 2005a). All the while, this engagement is building the mental processes and tactile skills of the crisis manager. Learning occurs at the most concrete levels of SBT, such as training intended to develop individual skills (Lynch, 2005). It also occurs at every level of abstraction beyond this (Quanjel, Willems, & Talen, 1998). For example, a higher level of abstraction may be used to train a policy group consisting of the chief elected officials from several jurisdictions who are concerned with the mitigation of a problem, such as financing a prolonged response and returning the community back to normal. More concrete training would be used for the application of the proper tactics of a physical rescue. SBT provides a context and environment in which these chief elected officers are able to develop their decision-making processes in the context of an actual, real-time event (Moats et al., 2004).

Implications for Research, Theory, and Practice

What we can conclude in this article is based on our consideration of these two well-known cases of crisis. In both of these cases, individuals (a) failed to believe that the actual outcome was possible when presented with it beforehand and (b) spent minimal time and effort on training for dealing with the outcome, or both. The consequences of failing to believe and consider responses to these "unbelievable" situations were dire. These key conclusions have implications for HRD professionals in three domains, namely, (a) research, (b) theory, and (c) practice.

Implications for Research

Problems with believability are not new in scenario planning. Often, organizational leaders lack the courage to act on information provided in scenarios and other "what if" exercises (de Geus, 1999) as it can be incorrect. Still, rigorous research about precisely what makes for an effective set of scenarios that "change the mindset of the organization" (Korte & Chermack, 2007, p. 646) is

severely lacking. Qualitative research with scenario-planning participants would be very valuable in terms of gaining a better understanding of what makes scenarios effective or ineffective, and yet it is missing from the literature entirely.

Overall, research on scenario planning is generally minimal although an ambitions research agenda is beginning to show relationships between scenario planning and organizational learning (Chermack, Lynham, & van der Merwe, 2006), between scenario planning and conversation skills (Chermack et al., 2007), and between scenario planning and decision-making styles (Chermack, 2008). However, remaining questions center on the role of leadership in the scenario-planning process, investigating a link between scenario planning and overall organization performance.

Implications for Theory

This article poses two key implications for HRD theory. First, although scenario planning is most commonly used in corporate strategic planning, its use in crisis avoidance provides another way in which HRD professionals may be involved in local, state, and national policy issues. However, the theory development work that has been done on scenario planning (Chermack, 2004) implies a corporate planning context explicitly. Therefore, if scenario planning is gaining use in contexts such as city planning, weather, and other natural disaster consideration, and even in issues related to national policy (such as homeland security), the theory developed by Chermack may need to be adjusted and modified to understand what scenario planning is and how it may work differently in this alternate context.

Second, although there is a long history of using SBT in the emergency response discipline (Lynch, 2005; Whitcomb, 1999), there has not been any clear theory development effort in this area. It seems clear that such an effort would draw from transformational and experiential learning theories, but a theory development effort in this area is an opportunity to bring the other components into a model that helps us understand how to more effectively engage in this kind of training. By developing a theory of SBT, HRD professionals have yet an additional research agenda that seems important in local, state, and national governments not only in the Unites States, but increasingly around the world.

Implications for Practice

As a result of considering these two cases and these two key points of failure, we can make further recommendations for the practice of scenario planning and SBT. A key is implementing “checkpoints” in scenario planning and SBT. These checkpoints can serve as evaluation points in any scenario-based project and we suggest that the use of these will support the effective use of scenario-based methodologies.

First, the tendency to ignore certain scenarios that are perceived to be unlikely is a serious pitfall and has been identified in several situations as a problem that has thwarted the intent of scenario planning (de Geus, 1988, 1999). To work around this issue, practitioners can make sure that probability assignments are avoided at all costs. The goal in scenario planning is to treat each scenario as an equally likely case of how the future may unfold. Thus, each scenario should receive serious consideration. Scenario planning can be an iterative process, and some scenarios may be rejected throughout the project. Even so, any final set of scenarios includes 4-6 scenarios and each of these should be individually relevant, plausible, and challenging.

An additional consideration is to clarify the purpose of scenario planning from the outset. Often, executive teams have difficulties shifting away from their tendencies to want to predict the future, rather than to learn from considering a variety of plausible alternatives. This emphasis on learning redirects the project and its purpose, and this learning purpose may need to be revisited and stressed throughout the project. Implementing some kind of learning checkpoints or creating time and space specifically for reflecting on what learning is happening during the project is one way of ensuring commitment to the learning purpose. In short, scenario planning should not simply be a "new version of strategic planning" as the purposes of these two activities are fundamentally different. van der Heijden (2002) discussed that one-shot attempts at replacing traditional strategic planning processes with scenario planning are generally ineffective as the assumptions underlying scenario planning and its purposes are so drastically different.

Conclusions

This article has described two cutting-edge methods for managing and avoiding crisis. The thesis of this article was that these methods were not properly used in two recent cases of crisis. Our analysis has suggested where the use of these methods went wrong and has provided suggestions and key tips for improving the use of these methods in the future. Two key pitfalls were identified in both cases: (a) lack of vision and (b) lack of action once crisis began to unfold. The implications of the suggested solutions to these key pitfalls have been discussed in the context of HRD research, theory, and practice.

Planning can be considered one of the most difficult and ambiguous organizational activities (Mintzberg et al., 1998), and the level of uncertainty for decision makers to account for has never been so high. There will never be a method that is 100% reliable in terms of its ability to steer organizations away from crisis (Mitroff, 2005a). However, scenario planning and SBT are the best of what can be offered to address these serious deficiencies. Study is required to understand how and why these practice-born techniques work. In addition, study should also look for ways to transfer these techniques to organizations. Mitroff (2005a) offered this warning to all organizations:

> Like everything else in a complex world, proper crisis planning can never be a purely technical activity. It is profoundly political. But, as I have been arguing, it is profoundly philosophical as well. Indeed, it is the failure of our underlying concepts and institutions to keep pace and to change that is at the root of difficulties.
>
> The clock for the next crisis is ticking constantly. It never rests. It is already recording how well and how poorly we have been doing in preparing for the next crisis. Is anyone learning? (p. 3)

These techniques can initiate change and equip crisis managers to prepare and respond to the next crisis.

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