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A Reference Framework to Build Crisis Exercises for Strategic Crisis Unit: an Integrated Approach from Scenario to Debriefing

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During crises, organisations face with a dynamic process characterised by numerous destabilising factors. Preparing to face these difficulties is therefore essential. Simulation sessions based on immersive and realistic crisis exercises are a technique to replace real experiences. In order to facilitate and increase learning, specific methodologies are required to facilitate the immersion of learners but also to construct the pedagogical elements of the played scenario. Learners' observation and debriefing of the exercise (key phase to improve learning) are intrinsically linked with the scenario's design. This paper deals with the integrated approach developed throughout ten years of research on crisis management training conducted at the IMT Mines Ales (France) within its crisis management platform.

1. Introduction

Crises are highly destabilising events for organisations (Topper and Lagadec, 2013). In particular, the main features of crises are first the surprise, then the importance of the consequences either real or potential (dead or injured people, financial loss ...). Exceeding capacities (material, physical or even psychological), disorganisation and numerous uncertainties are also specific of these situations. Furthermore, paralysing fears and various sources of extreme pressure (time pressure, media coverage, etc.) contribute to increase stress and make crises management very difficult. It can even in some situations hinder decision-making by reducing information search and number of alternative solutions, by "interpreting unknown events in terms of familiar or expected events" (Weisæth et al., 2002).

Preparing to face these difficulties and severe psychological stress moments is consequently crucial. Several types of crisis management training exist: from lectures/seminar/workshops, tabletop exercises, to simulation exercises (also sometimes called functional exercises) and finally large-scale exercises. These last ones being both the more complex and expensive training situations but also the most operational training being the closest to a real crisis. Simulation sessions based on immersive and realistic crisis exercises are a technique to replace real experiences as emphasized by Kolb's experiential learning theory and by the importance of active participation in the learning activities.

Functional exercises, which can be assimilated to high-fidelity simulations used mainly in healthcare training are therefore particularly well suited to train strategic crisis unit. These crisis management training simulations are part of a socio-constructivist approach since knowledge is built from individual and group experience through the reciprocal sharing of knowledge in a simulated operational environment. This kind of training sessions allow personnel to improve both technical and non-technical abilities such as teamwork skills, situation awareness, and cooperation and communication mechanisms between members. Furthermore, it allows acquiring pattern recognition skills on which decision-making is partly based (Crichton, 2001) and finally enhancing expertise of crisis team members. Cannon-Bowers and Salas (2001) explore the different aspects required for an effective training: training needs analysis including work and task analysis, training conditions (individual characteristics, training motivation ...), training methods (i.e simulation-based trainings and games), and finally post-training conditions with a particular focus on training evaluation and transfer of training in the daily work.

In this paper, these different steps are explored for the specific case of crisis management training except the last one that, which in this specific activity is not directly applicable.

To promote in-depth learning, several conditions must be combined (Vanpee, Godin & Lebrun, 2008):

- The relevance/credibility of the situation for the learner and in the learner's perception of the context in which the learning takes place. Contextualised learning situations allow for a better understanding of knowledge and its limits, but also to know how to reuse it with discernment.
- Confrontation with complex and varied situations. The complexity of the information to be processed induces reflection and not automatism (Boudreault, 2007) and thus encourages awareness of the processing carried out (metacognitive process). The multiplicity of situations makes it possible to distinguish important data from incidental data and thus to establish knowledge that can be generalised and therefore used in other contexts.
- Favourable affective and motivational conditions that give meaning (understanding of the reason for the training exercise and what it will be used for). Autonomous or intrinsic motivation should be favoured, particularly when it comes to complex or heuristic tasks requiring a high level of reflection or creativity (Deci & Ryan, 2008).
- The presence of a third party as a "support system" for the acquisition of knowledge (in line with the socio-constructivist trend).

So, this research paper is devoted to the concept of experiential learning to train strategic crisis teammates. The first part deals with the conceptual and methodological framework of crisis management training sessions that allow to better support the learners in their learning. First, the realism (with regard to the abovementioned specificities of crises), the immersion of the learners during the simulations (physical, emotional...) are discussed. Then, the following part focuses in particular on the learners' objectives with regard to the required crisis managers' abilities, the pedagogical scripting by defining a typology of stimuli and addressing difficulty level of the scenario owing to the participants' background. Finally, the observation of learners during exercises will be the subject of a specific point as far as it contributes to feed the debriefing step that is a key element of learning.

2. Conditions for “good” learning environment

2.1 Favorable affective and motivational conditions

Simulation by being an active-teaching method enhances intrinsically the motivation of students in learning. Many reasons are given in (Zorn et al.2019) of which simulation gives students meaning. To maintain this motivation, favourable affective conditions must be achieved by creating a reassuring and caring atmosphere from the beginning of the briefing to the end of the debriefing. Furthermore, participants must be aware of and accept the limits of the simulations (some things are different from reality) so that to engage in an experience that they perceive as intrinsically motivating.

2.2 Physical environment of the simulation

To facilitate immersion in the exercise and depending on the objectives and its context, the simulation environment should be close enough to the real working environment, in this case: a crisis room. Owing to the training objectives identified before the exercise, the crisis management room used for exercises can be:

- The real crisis room of the crisis team so that they can be immersed in its usual work's habits and manage to work with the crisis room's available tools.
- A reproduction of an environment close to a real crisis cell as shown in the picture of Figure 1. Owing to the trained groups and what they have in real situations or what they wish to test, several devices can be used such as large touch screens, flip charts, whiteboards, phones, printers, computers ...
- Conversely, few equipment can be given to the crisis team if the objectives are to work in really poor and degraded conditions... for example to simulate that the crisis has moved to a fall-back room or if there is an electricity black out.

Depending on the configurations, the objectives may be to look at the ability of crisis team members to question their work habits, to manage stress, etc.



Figure 1: Example of a crisis simulation room

2.3 Emotional environment of the simulation

During the simulations, immersion can be achieved through two specific points: on the one hand, the fidelity of the proposed scenarios with regards to the elements that constitute a crisis; on the other, an immersive crisis room.

- Go further with the physical environment of the simulation

The crisis simulation platform can be equipped with sensorial devices (soundscape to simulate explosion, rain, sirens, and also independent heating and cooling to represent degraded ambient conditions for example). This allows reinforcing the immersion in the crisis by stimulating senses and emotions. By analogy with elements mentioned by Mikropoulos and Natsis (2011) for use of virtual environments in education, multisensory interaction channels may contribute to the “presence” perceptual and cognitive feature described as the user’s “sense of being there”.

In order to create a learning environment that is close to reality, a realistic physical environment is not enough; the difficulties to be overcome must also have a “trueness” that represents strong disturbing events and potential cascading effects (Judek, 2019).

- Scenario design:

It defines the framework of the technical objectives to be achieved. Another challenge of storytelling lies in taking into account the crisis universe and being able to recreate it during the simulation in particular through the exercise’s scenario.

For this purpose, a specific methodology was proposed by (Limousin, 2018). It consists first in the analysis of past events in order to identify the main characteristics of different crises; then to propose a model of their dynamics. A typology of crisis’ features due to natural hazards or technological accidents is proposed in Figure 2. For example, crisis managers will have to deal with uncertainty, ambiguity, complexity, false trails, etc. Then, based on these former steps, as already done in the artistic field, it may be interesting to recreate the crisis dynamics by injecting specific messages of the above-mentioned categories at the right time and frequency (on the basis of the identified dynamics) and with the good magnitude (see Figure 3). Nevertheless, one may be careful to adapt the level difficulty (number and complexity of the injected stimuli) to the participants’ level not to reach the cognitive overload and exit from the optimal performant zone as identified by Yerkes and Dodson. Indeed, “anxiety improves performance until a certain optimum level of arousal has been reached. Beyond that point, performance deteriorates as higher levels of anxiety are attained.” (Bardwick’s 1991), cited by (White, 2009).



Figure 2: Crisis’ characteristics stimuli

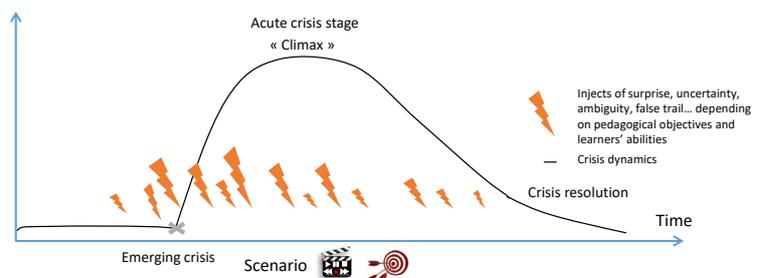


Figure 3: Scheme of scenario injects

3. Prerequisite for the scenario design: pedagogical and flexible scenario

The scenario is the skeleton of the simulation exercise and as such requires special attention. The main purpose of the scenario is, according to the objectives, to verify/test or maintain and above all develop specific skills of the crisis cell in an optimal way. In general, a functional scenario exercise is mainly driven by the simulated events such as a natural hazard (flood, hurricane) or a chemical hazard (explosion, toxic gas dispersion), etc. which set the scene for learning activities.

3.1 Proposition of different categories of stimuli

First, the scenario should address the abilities foreseen in the identification of the learning objectives. In another words, the injected stimuli must be able to either address a selection of technical skills but also non-technical ones (NTS) that are required by the crisis team to cope with a crisis. Therefore, beyond the stimuli necessary to simulate a crisis, other stimuli should be inserted in the scenario with specific features as proposed on figure 4. Four types of stimuli are defined, first the operational stimuli allowing to challenge learners on specific technical and organizational abilities (for example, assessment of the consequences of the hazardous event consequences, assessment of vulnerable stakes, communication with population, anticipation etc.). Then, support stimuli are injected in the scenario not to solicit unselected objectives which can be solicited by other injects ; indeed, some injects may intrinsically solicit several objectives and abilities. Support injects are then designed to help participants only if and when necessary. Finally, recall stimuli also help participants by re-injecting a message that participants have forgotten or misunderstood (either injecting it in the same or a different form).

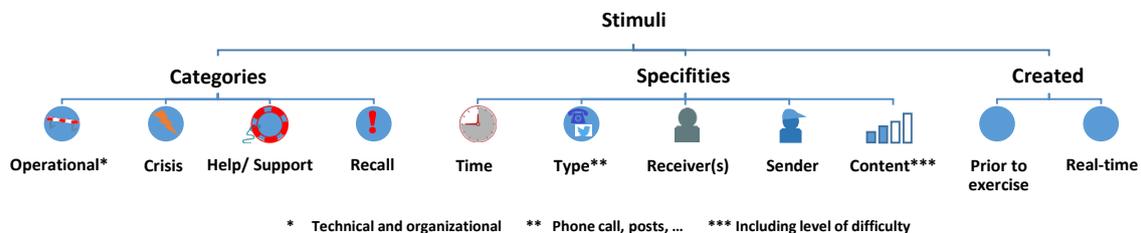


Figure 4: Typology and characteristics of stimuli

3.2 Main features required for a scenario

Nevertheless, “crisis solving” should not be too easy; otherwise, learners will not learn a lot, may think that crisis management is only based on the easy implementation of procedures or even may demotivate them. Conversely, it should not be too difficult for learning reasons. Indeed, if learners are faced with insurmountable events, they may disengage, may be demotivated by a loss of reference that is contradictory to pedagogical rules. Therefore, one can say that the scenario must be flexible to be adaptive to the learners’ level (sometimes different for each participant) but also to their answers and reactions during the exercise.

Furthermore, learners are expecting a consistent (no contradictions), plausible (it might happen even if the sequence of events is highly unlikely to occur), credible (existing links between the dependent events of the scenario) and relevant scenario (Walker, 1995). As abovementioned, a challenge for the scriptwriter is to introduce into the scenario elements specific of the crisis with a temporality similar to that of a crisis to enhance credibility and relevancy.

4. Facilitation, observation, and debriefing

4.1 Facilitation of exercise

The animation team needs to be prepared to facilitate the exercise and participate to the immersion. First, the team needs to know the scenario in advance so that, as for learners, they can immerse themselves in their roles (often multiple) and be convincing. Secondly, they also need to understand the pedagogical objectives so that they can be able to readjust their answers to the players when required for example by the leader of facilitation team (e.g. modify the number of stimuli upward or downward). Thirdly, they should adapt in real-time by being able to propose an evolving and interacting scenario according to the decisions taken by the crisis cell.

As mentioned earlier, observers are important partners for the facilitation team by being the eyes and the ears of what is happening in the crisis simulation room. They can easily detect specific problems of the learners. In particular, they can observe the difficulties of the organization of the crisis cell, the information circulation between the participants and communicate them to the animation cell.

For example, observers and animators can be in relation thanks to phone groups or social media (as WhatsApp). In this way, observers can point out learners' difficulties to animators and get them to send supportive stimuli, recall stimuli or even redirect the planned scenario. Adapting the injected stimuli can then help to keep the participants motivated and immersed in the simulation and thus avoid putting them under too much pressure to go beyond the optimal learning zone (or conversely, leave them in their comfort zone, which would also reduce learning).

4.2 Observation and debriefing

However, the observation's tool that enables the facilitation team to check that the objectives are being met by the crisis team design must be thought out at the same time as the development of the scenario. Participants' observations during the exercise simulation feed into the discussions and exchanges that take place during the debriefing phase between the participants and the facilitator. Indeed, debriefing is recognized as a crucial phase of learning in an experiential situation (Fanning & Gaba, 2007; Salas et al., 2009).

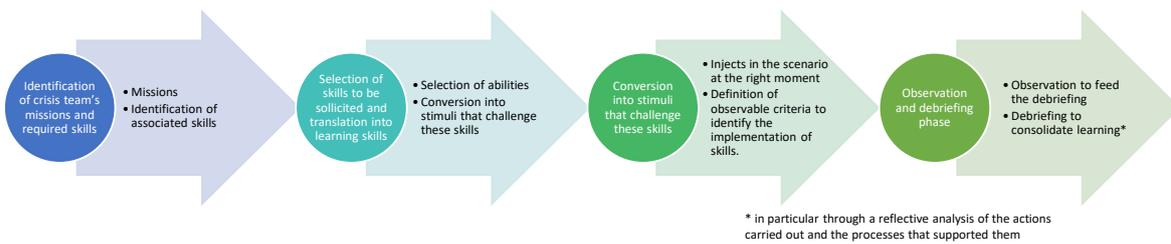


Figure 5: Methodology to link crisis cell's missions to stimuli injects in the scenario, to observation and debriefing

5. Towards an integrated approach

Finally, a crisis simulation exercise must follow an integrated approach to be efficient. The realisation of an exercise is based on a cyclical activity consisting of several coupled stages as illustrated on figure 6. The first stage is based on the identification of the training objectives which, on the basis of an adapted design methodology, allows the elaboration of a scenario favouring learning. At the same time, it is necessary to build the observation tools that will be useful during the exercise facilitation but especially for the debriefing phase. This is followed by the exercise facilitation phase. This phase also makes it possible to accompany the learning process by adapting in real time to the reactions of the learners, thus promoting immersion and a climate conducive to learning. To do this, specific preparation of the facilitation teams and a direct link between facilitation and observation must be put in place. Finally, all these elements contribute to the last key phase of learning, the debriefing, which enables the identification of the elements for improvement to be implemented during the next exercise.

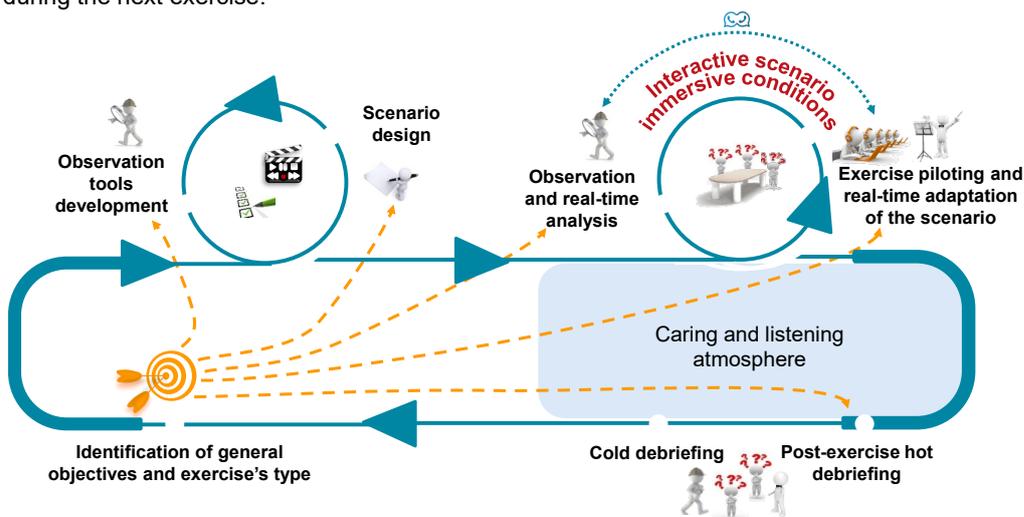


Figure 6: Integrated approach for a crisis simulation exercise

6. Conclusion

In conclusion, to optimize learning during exercises, we proposed an integrated approach, combining scripting, animation, observation and preparation of the debriefing. Centered on the pedagogical objectives and the learners' abilities it relies on the immersion of learners but also on the adaptation of facilitators and observers to the reactions of participants. This view supports the idea of interdependencies between the activities of organisers, facilitators, observers and learners. Beyond this approach, the key words during the realization of an exercise (from the briefing to the debriefing, including animation and observation) are adaptation to the learners' capacities and benevolence to facilitate confidence and thus the implementation and acquisition of skills.

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