

Instructor's Tasks in Crisis Management Training

Amy Rankin

Linköping university
amy.rankin@liu.se

Joris Field

National aerospace laboratories, NLR
joris.field@nlr.nl

Rita Kovordanyi

Linköping university
rita.kovordanyi@liu.se

Henrik Eriksson

Linköping university
henrik.eriksson@liu.se

ABSTRACT

In crisis management exercises the instructor's performance is critical to the success of the training. It is their responsibility to monitor and evaluate the exercise, as well as appropriately adjust and adapt the scenario to the unfolding events. Despite the importance of the instructor's skills in crisis management training little has been documented regarding successful methods or common pitfalls. The study presented in this paper is exploratory and aimed at investigating how instructors monitor and control large scale crisis management exercises. The results are intended to be used as a basis for further investigation on how instructors can be supported in virtual reality training systems. A summary of results from interviews is presented and followed by observations reports from two live exercises. Finally, key areas for instructor support in virtual-reality training systems are identified.

Keywords

Instructor support, Exercise Management, Crisis Management, Training Systems

INTRODUCTION

Planning an exercise scenario for a large scale crisis is about "creating a problem", and does not include a fixed solution. Exercise plans can therefore at best be approximate and have to be adapted throughout the exercise. Events can, for instance, not be exactly timed as the flow of the exercise often changes depending on the actions taken by the trainees. Once the problem is created the trainee's task is to "solve the problem" with instructors there to guide, evaluate and control the exercise. Hence, the instructor's tasks are diverse and manifold as situations are complex with multiple simultaneous on-going events and cross-organisational participation. Further, multiple instructors are involved and have to co-ordinate their efforts to obtain a common view of the unfolding events. Evaluating, guiding and supporting trainees in large scale crisis situations therefore greatly differ from training technical and procedural skills (see e.g., Kleiboer, 1997; Moats, Chermack, & Dooley, 2008; Stolk, 2001).

So, how do instructors monitor and evaluate trainee's performance in complex and ambiguous situations? On what information do they base their decision to increase workload, intervene or stop the exercise? As common with subject-matter experts tacit knowledge is difficult to verbalise and previous experiences is often considered a key ingredient. Also, articulated methods are not commonly used by instructors and previous studies in the area appear to be rare.

In an FP7 project, CRISIS, aimed at designing an interactive virtual reality (VR) environment for crisis management training we investigating how the instructor's tasks can be supported in the training system (Field, Rankin, & Morin, 2012; Jenvald, Morin, & Eriksson, 2010; Kovordanyi et al., 2012; Rankin et al., 2011). The aim of the exploratory study presented in this paper is to identify strategies used by instructors in large scale live crisis management exercises to monitor and control the unfolding events. This research is intended to lay the basis for further investigation on support tools for exercise management teams in virtual-reality training systems.

BACKGROUND

Our first insights into live exercise management were received from workshops with experienced instructors in crisis management training. The workshops included group discussions and semi-structured interviews. They were half-day events and conducted on six separate occasions over a period of six months. The workshops covered a range of topics regarding crisis-management training and only key areas focusing on the execution of training sessions will be reported here, that is, how exercise management teams (including instructors and observers) come together during an exercise to monitor and control the flow of events.

One of the most difficult tasks, reported by the instructors, is to get an overview of the on-going situation. In exercises focused on strategic management, keeping track of the simulated world, commonly enacted by the instructors, was one of the main concerns. In large exercises where operational teams are distributed over a larger area, gaining a holistic perspective of the constantly developing events was noted as challenging and requires tight communication and co-ordination within the instructor team.

The importance of training objectives greatly differed among the instructors interviewed. Some instructors reported that the training objectives guided the entire exercise and others said that they were never explicitly established or discussed. In the latter cases the main goal during the planning phase was to ensure that all trainees were involved and kept busy throughout the exercise. Regarding approaches to gather information for the evaluation process of the trainees' performance, the instructors could not provide a simple answer. The reason for this is that it differs from one training session to the next, depending on the context and the training objectives. However, some recurring topics from the workshops were to "look out for main cues", such as when an initial report was provided to the strategic command teams, general communication patterns (frequency and clarity) and cross-organisational interactions.

The exercise management teams are not only there to evaluate performance but also to ensure valuable training in the on-going simulation. This could, for instance, be to monitor the trainees' or teams stress-level to make sure they are not overwhelmed or under stimulated. Also it is important to have the ability to detect if something is about to go wrong so that plans can be altered to make sure this does not change the entire course of the exercise.

METHOD

To gain deeper understanding for issues that were raised during the workshops observations were made at two live exercises for crisis management.

Case 1 - The first live exercise observed was performed at the Center for Teaching and Research in Disaster Medicine and Traumatology in Linköping, Sweden. It was the final part of a two day medical command course using the Emergo Train Systems (Wakasugi, Nilsson, Hornwall, Vikström, & Rüter, 2009) and lasted for approximately 4 hours. The 50 trainees partaking in the exercise all acted in their professional roles. They had a varying amount of experience, regarding both in training and in real life. The scenario was an accident involving a train crash with about 300 persons on board the train, whereof 170 needed medical attention. The exercise involved 6 command centers.

The instructors' team included an exercise manager, instructors and role-playing actors. The role of the instructors included monitoring and evaluating the training, controlling the flow of events and intervening when necessary. No difference was made between instructors and observers in this exercise. The instructor team was located in one room and in continuous verbal communication with each-other. A pre-planned exercise script was used, including the order and approximate time of events. Changes to the script were only done after consultation with the exercise manager and followed by a short debriefing for all instructors. There was one designated instructor for each of the 6 command centers. They followed their command team via headphones and a screen. Each instructor was equipped with a checklist used to score each team's performance on certain tasks.

Case 2 - The exercise took place in the municipality of Kinda, Sweden. Approximately 40 trainees partook during the 5 hour exercise and all participants acted in their professional roles. The events started out as an alert from a water testing laboratory concerning bacteria in the tap water, which was thought to cause illness. Further, the municipality's homepage was hacked spreading rumors about the bacteria. About half way through the exercise a fire broke out at a home for the elderly, with signs of arson.

In the exercise management team all instructors were also role-players acting out the simulation such as fire chief or journalist. Most instructors were acting in their professional roles, and had varying experiences of previous crisis management training. For some it was their first time and others had been involved with the municipality's crisis management training for decades. The team was located in one room and continuously

updated each other on the current situation. No observers or video cameras were used to monitor the work at the command center. The main events were pre-defined but no script was used. The exercise management had a meeting before the exercise to discuss the scenario and the respective roles played by the team. However, each individual was responsible for formulating sub-events and creating responses to stimulate the exercise.

OBSERVATION REPORTS

In this section observation reports exemplifying different types of situations faced by the instructors are presented.

Exercise monitoring - Monitoring the ongoing exercises was mostly done using pen, paper and verbal communication with other instructors. In Case 1 a very structured monitoring style was demonstrated, including a scenario script and a checklist used to score accomplished tasks. Also, the exercise management team was organised so that the instructors had a designated group of trainees to monitor and the exercise manager was consulted prior to any adjustments made during the exercise. Joint briefings were held to keep everyone updated on current events and changes. In Case 2 no scripts were used, although, the main events were noted on the common whiteboard. Also, several instructors had prepared notes and possible responses on a piece of paper. Each individual was responsible for appropriate responses based on the role they were playing in the exercise. Pen, paper and in some cases individual laptops were used to keep track of performed and planned actions. Verbal communication was used to create a shared situation assessment and coordination event injects.

Realistic responses - To create a realistic setting and increase awareness of the consequences of actions, events were created and altered throughout the exercises. For instance, in Case 2, a worried relative phones the municipality's telephone exchange asking about the fire. When not receiving enough information the relative proceeded to suggest that he would drive over there himself, which was approved by the receptionist. During a large fire with many deceased casualties worried relatives on-site can be a huge disruption to the ongoing operation. To make the trainees aware of this the instructors respond by adding events stressing the issue, that is, increase the burden for the fire fighters due to the public. The municipality's command team rapidly became aware that this response could cause big problem and that they had to provide better information to the public.

Increase or decrease workload - Another reason to alter events may be to increase or decrease the workload for a particular trainee or a team. This was exemplified in Case 1 when one of the regional command teams was under-stimulated compared to the corresponding teams in the other regions. After a quick debriefing the exercise management staff decided that a bomb threat at a local shopping mall would provide the team with an appropriate increase in workload.

Intervene or pause the exercise - Most instructors partaking in this study reported that altering events of the exercise was the preferred way of managing the exercise. However, it was also made clear that it is sometimes necessary to intervene or pause the exercise to brief the trainees. In Case 1 the instructors paused the exercise as a command teams made a decision that may have jeopardised the entire course of the scenario. They had made a decision to close off the Emergency Room at the local hospital to any patients not involved in the train accident. Further, the command team did not relay this information to the right people. This decision would have set off a whole set of consequences, causing stress for all other command teams and increased workload for the instructors. As this was not part of the script or uniform with the training objectives the instructor (after consultation from the exercise manager) paused the exercise to brief the team on the consequences of their actions. A short briefing to update all the instructor and role-playing actors was also given. For some instructors stopping an exercise is taken as a last resort when there is a risk it might get out of hand. However, other instructors reported that interfering with the exercise was seen as part of the learning process and used to increase awareness of risks.

Problems faced - Deciding when to add or adjust events is not a straightforward task and it is not always successfully accomplished. Keeping up with the flow of events is hard as unexpected things happen. This was exemplified several times during the observed exercises. For instance (Case 2), according to the planned scenario, a fire broke out at a home for the elderly. The aim of this event was to create an increased stress on the water tank resources which were all assumed to be in use due to the bacteria problem in the tap water. However, the municipalities command team (the trainees) had solved this problem by getting water supplies from neighboring municipalities, a solution not anticipated by the instructors. So when the fire event was set into play it did not cause the expected increase in workload. Further, a lot of journalists had been involved in the exercise to allow the municipality's command team to train media management. However, the command team made a decision to only allow their media informant to give out information, making it hard for the journalists to put pressure on the entire team.

Different training approaches

The two cases have illustrated different strategies used by exercise management team to monitor and control the exercise. On the one hand (Case 1) well defined training objectives, performance measurements and careful instructor observation and coordination gave the trainees strong guidance to learn specific skills. It also allowed a structured way to gather and share detailed information about the trainees, increasing the instructors' ability to adjust the exercise and provide challenges at an appropriate level. In Case 2 close monitoring was not performed on site and no clear training goals were set. This provided a different training environment where the flow of events could not be as well controlled but unexpected solutions to problems had greater leverage.

Pros and cons can be identified in the different approaches. They both provide an added experience, and in Case 1 the approach also provides the trainees with a set of pre-defined skills. In this case the learning curve can be well documented and suited to fit a certain trainee. A benefit of not having clearly defined training goals is that the trainee's solutions to problems can be tested as the exercise may not be paused to ensure that the exercise would follow the script as was done in Case 1. During the after action review in both cases the trainees reported that the exercise had been very rewarding.

IMPLICATIONS FOR INSTRUCTOR SUPPORT IN VIRTUAL-REALITY TRAINING SYSTEMS

Virtual-reality training systems have the advantage of being able to automatically provide information from the ongoing event to the instructor. However, it can easily become overwhelming and it is therefore useful to have support systems that can seed out information particularly relevant.

The type of information relevant to the exercise management team may greatly vary from one training session to the next, depending on the current training objectives, the level of the trainee etc. This suggests that a flexible system is beneficial so the type of information visible during a training session can be altered. A lot of the trainee's performance cannot be evaluated using quantifiable measurements and therefore requires someone to interpret and analyse the information. Support systems can therefore greatly aid both the management and analysis of the on-going events. Regarding management this could be, for instance, communication possibilities between instructors, interactive scenario scripts and observation logs. For analysis real-time support for extracting useful information about the on-going events could be provided. Areas concerning both types of support systems are listed below.

Communication tools - In the studied cases the informal discussions within the exercise manager team was by far the most critical aspect for successful monitoring and controlling of the exercises. If training is distributed and the exercise management team members are not co-located, tools to support both verbal and written communication are necessary. These abilities should also be available to allow instructors to communicate with the trainee during the exercise.

Scenario script and observation logs - An interactive scenario script with planned events that can be adjusted throughout the exercise would be helpful. Suggested actions and performed actions can be tagged to allow the instructors to keep track of other instructors injects into the scenario. Digitalized observations logs should also be available.

Changing the flow of events - Altering the number and type of events can be aided by providing the instructor with a group of events available in the system. These could be tagged to particular training objectives or roles active in the training session to further guide the instructor.

Information about on-going events - For the instructor to assess the situation it is critical to keep track of main events, for instance, "the bomb at the airport security check has now been detonated" or "the fire in the plane has now been extinguished".

Performance measures - The system could also provide information related to certain over-arching training objectives common to the type of scenarios in the training system. Let's say, for example, casualty management is one of the main training objectives. The number of triaged or transported casualties could be automatically reported to the instructor every 10 or 20 minutes. This information could also be provided if the trainees do not meet certain expectations, for example, after 45 minutes "there are still 15 casualties at the plane wreckage that have not been triaged" or after 30 min "the on-scene medical coordinator has not been in contact with the medical commander".

Question and answering - Training systems open up the possibility for the instructor to instantly receive detailed information about what is going on in the virtual world. For instance, the instructor can move between locations in a split second, or overlook several locations at once. A navigation tool that can answer simple questions could

greatly aid the instructor, for instance, “where is trainee X?” or “go to trainee X”. Information may also concern other things such as “which persons has X contacted via radio in the last 15 minutes?”

CONCLUDING REMARKS

The instructor's tasks during crisis management exercises are complex and diverse. Based on interviews with exercise managers and observation from live exercises areas suitable for support systems in crisis management training systems have been identified. Training for crisis management requires a flexible exercise management team. Performance indicators may be hard to specify as many of the training objectives are not quantifiable and have to be interpreted together with knowledge about the. The suggested areas where support systems can be used are therefore not intended to replace the role of the instructor by evaluating the training session or altering events. The main goal is to provide the instructor with support in managing the exercise, indicating potential problems or highlighting points of interest. The interpretations are still made by the instructors who can adjust the exercise based on the current training objectives. Although this study is limited in its scope it suggests that different methods and approaches are used. The specifics of the support tools suggested should therefore be developed together with the end-users organisations and tailored to fit their needs.

In the upcoming months observations of two more exercises will be carried out to gain deeper understanding for the issues raised. A support tool prototype is also currently being built and will be tested together with the end-user organisations.

An important issue which deserves attention in future studies is how the situation assessment is affected by the fact that the instructor is removed “from the scene” and placed in front of a computer screen. Situation and performance assessments are based on many factors and some of these may be affected by removing instructors from the scene. Additional types of information to gain the same understanding as during live exercises may therefore be required.

ACKNOWLEDGEMENTS

The research for this study was carried out under the CRISIS project, funded by the European Commission's FP7 Framework Programme for Security Research, Grant Agreement Number FP7-24247.

REFERENCES

1. Field, J., Rankin, A., & Morin, M. (2012). Instructor Tools for Virtual Training Systems. *Proceedings of ISCRAM2012*. Vancouver, Canada.
2. Jenvald, J., Morin, M., & Eriksson, H. (2010). Challenges for user interfaces in VR-supported command team training. *Proceedings of NordiCHI conference*. Reykjavik, Iceland.
3. Kleiboer, M. (1997). Simulation Methodology for Crisis Management Support. *Journal of Contingencies and Crisis Management*, 5(4), 198-206. Blackwell Publishers Ltd.
4. Kovordanyi, R., Pelfrene, J., Rankin, A., Schreiner, R., Jenvald, J., Morin, M., & Eriksson, H. (2012). Real-time Support of Exercise Managers' Situation Assessment and Decision Making. *Proceedings of ISCRAM2012*. Vancouver, Canada.
5. Moats, J. B., Chermack, T. J., & Dooley, L. M. (2008). Using Scenarios to Develop Crisis Managers: Applications of Scenario Planning and Scenario-Based Training. *Advances in Developing Human Resources*, 10(3), 397-424.
6. Rankin, A., Field, J., Kovordanyi, R., Morin, M., Jenvald, J., & Eriksson, H. (2011). Training Systems Design: Bridging The Gap Between User and Developers Using Storyboards. *Proceedings of European Conference on Cognitive Ergonomics*. Rostock, Germany.
7. Stolk, D. (2001). Gaming and multimedia applications for environmental crisis management training. *Computers in Human Behavior*, 17(5-6), 627-642.
8. Wakasugi, M., Nilsson, H., Hornwall, J., Vikström, T., & Rüter, A. (2009). Can performance indicators be used for pedagogic purposes in disaster medicine training? *Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine*, 17(15).