USING CRISISKIT AND ROLEPLAYERS FOR TRAINING EMERGENCY MANAGEMENT TEAMS

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Abstract

In order to reduce the effects of a disaster, people in the emergency management organisation have to be trained. In recent years training emergency management teams has become a bigger issue. In the Netherlands for example, emergency management teams have an official obligation to train once a year. A realistic and effective training of emergency management teams however is a difficult matter. We search for ways to improve this kind of training and to reduce the costs.

One of the results of the emergency management research at TNO Human Factors is the development of CrisisKit, a tool that can be used to train and support emergency management teams. In this paper we describe an exercise in which CrisisKit was used to train and support an emergency management team of an air base of the Royal Netherlands Airforce. The purpose of this exercise was to examine how CrisisKit could contribute to the team training and whether it has potential to be used as a support tool for this particular organisation. Based on the learning objectives of the team, we generated events that should occur during the training. These events were combined into a coherent and structured training scenario. CrisisKit distributed the scenario events to the responsible officers, who had to respond with realistic emergency management behaviour. In this exercise role-players were used to give a realistic response to information requests. Based on the experience of this exercise it can be concluded that CrisisKit can contribute to an effective training and that is has potential as an operational support tool.

Introduction

Emergency management, the decision making involved in directing relief operations after the disaster, is an issue of great public and private concern because of the potential losses involved (Schaafstal, Johanston & Oser, 2000) Emergency management is often extremely complex. The teams have to operate in hectic circumstances and often decisions have to be made based on incomplete information. The team members often hardly know each other and frequently have to work co-located. Fighting the disaster, a crisis team has to perform many tasks, partly parallel, partly successive.

As a result of the complexity of emergency management, emergency management training should have some characteristics. Competence based training is important because the teams have to be trained for unexpected situations. An other important element in an emergency management training is communication and co-operation within the team. It is not uncommon that the people in an emergency management team have never met as a team before a disaster. The multi-disciplinarity of an emergency team has some consequences for the training as well. During an emergency or disaster different organisations have to co-operate to fight the disaster,

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good communication between the team members is a must in those situations (Stroomer & Schaafstal, 2001).

Three years ago TNO Human Factors started an emergency management research program focused on decision making support and training. This resulted in the development of CrisisKit, a training and support tool for emergency management teams. In this paper we introduce CrisisKit, we describe its characteristics and its possibilities. Then we describe an emergency management exercise in which we tested CrisisKit as a training and support tool.

Thesis

In the exercise described in this paper we wanted to test CrisisKit as a training and support tool during an emergency management exercise with professional emergency managers. We expected CrisisKit to be useful as a tool for training. It can facilitate the trainers since actions can be computerised. We also believed it to have potential as a support tool for distributed decision making processes. In this usability test we wanted to discover which aspects of the tool were considered positive and which suggestions for improvement the experts could give us.

Sources of information

CrisisKit

CrisisKit is one of the results of the emergency management research at TNO Human Factors. It was originally developed as an emergency management support tool for distributed teams in the emergency management organisation but it is also suitable as a training tool.

Before we started the development of CrisisKit the crisis management organisation was examined (van Rijk, Post & van Verseveld, 2002). There are several teams at more then one level, each with its own tasks and responsibilities, and they have to cooperate during a disaster to limit the negative consequences (Figure 1). It is important to know the construction of the emergency management organisation before possible support and training tools can be considered. For example, you have to know which teams are positioned where in the organisation, and what the relation with the other teams is.

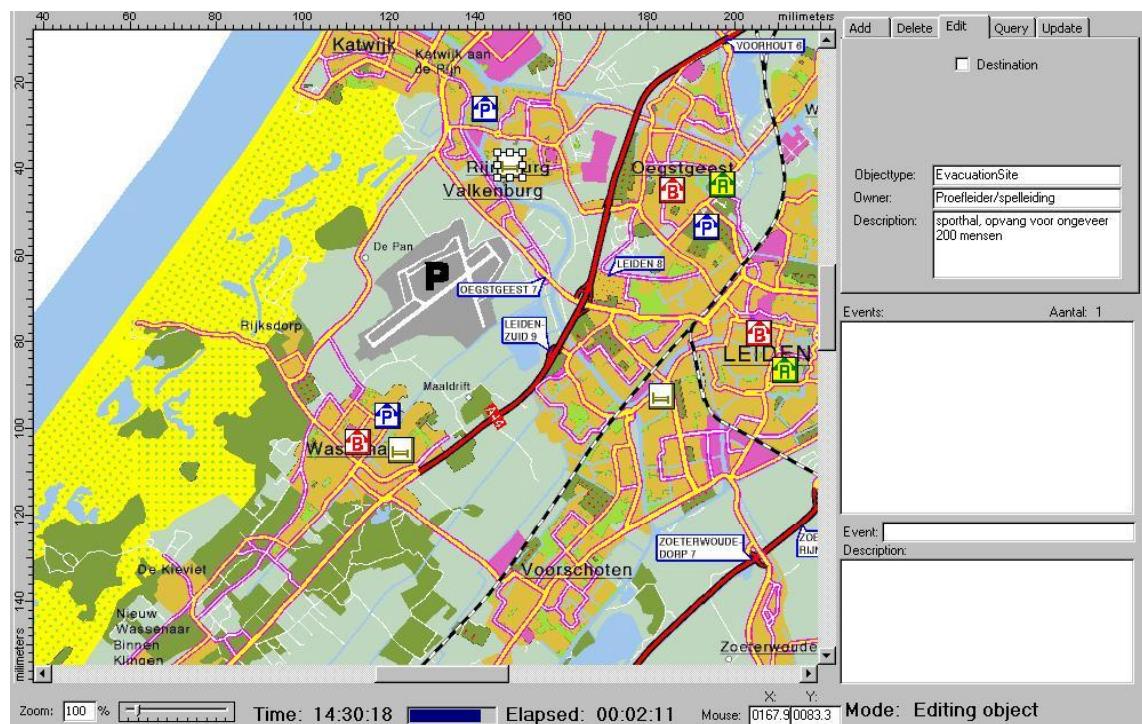Figure 1. The emergency management organisation
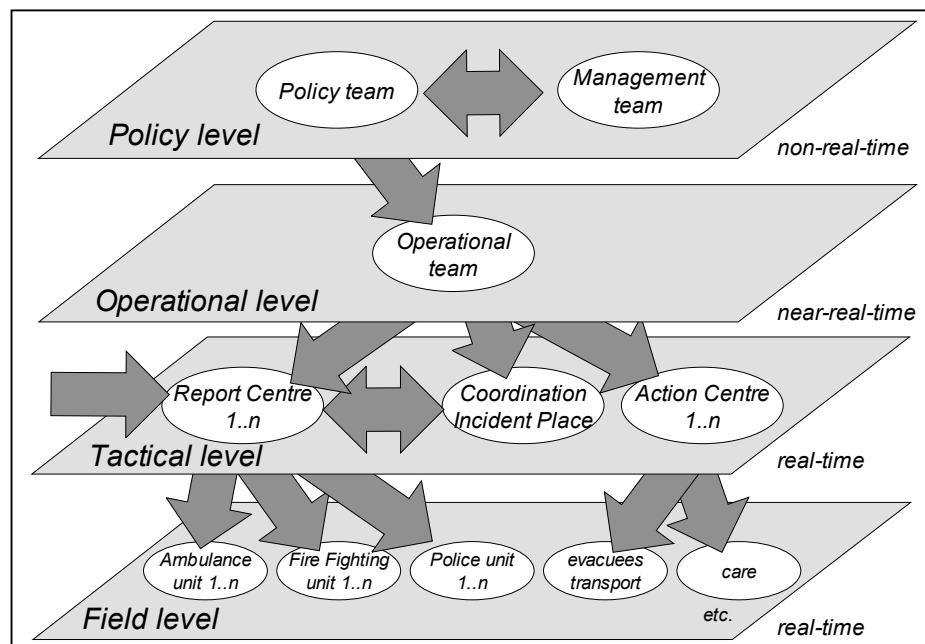
We did not only examine the emergency management organisation, but we also looked at the rest of the emergency management process, which includes information flows, teams, tasks, responsibilities, communication and co-ordination. Before suggestions could be made to support this process, a framework had to be found in which this could be described. We used descriptive modelling since it has proved itself in earlier research on command and control of Essens, Post and Rasker (2000) as a good method to gain clarity in a complicated process. Modelling allows the total to be separated in its essential elements, which decreases the complexity of the analysis. Modelling is also a good way to learn to understand a system. A model is a visualisation of the system, which facilitates the communication. Based on the above we have modelled the emergency management organisation in the Netherlands.

The information gained in these descriptive models was used to consider possible support for the work in this organisation. This resulted in the development of CrisisKit. CrisisKit is developed as a flexible program that can be adjusted to many situations, for example to every organisation structure, to each assignment of tasks and responsibilities to teams and their members and to each support question.

The primary user interface consists of a number of displays. It has a shared situation screen, for example a map of the disaster area, on which participants can place objects if the task requires it. It is possible to link supplementary information to the objects placed on the situation screen. There is also an overview screen on which casualties can be registered and a decision support tool that helps the teams to deliberate over problems. Figure 2 below shows the situation screen. It also has an overview of events in the scenario. Depending on the event allocation scenario events are send to the participating officers during the exercise. They have to respond to these events for example by placing an object on the situation screen, or by informing colleagues. CrisisKit also has an e-mail system, implemented with Microsoft NetMeeting, through which the participants can interact.

Figure 2. The primary user interface of CrisisKit, with the shared situation screen and the overview of the events in the scenario

The emergency management domain specialists who were shown CrisisKit during presentations and demonstrations also saw potential as a training tool. We have extended the program with a number of special training features (figure 3). These training features support the scenario developer and the training staff. It allows them to completely prepare the exercise in advance. There is a tool to assign the participating emergency managers to the exercise, a tool for assigning information events to the emergency managers and an editor to create information events and to time stamp them. It is also possible to temporarily halt the scenario, for example for a short briefing or to change the events, the event allocation or the event time during the exercise. This makes the program flexible enough to be able to let the scenario respond to the reactions of the team that is being trained.

Figure 3. The training device
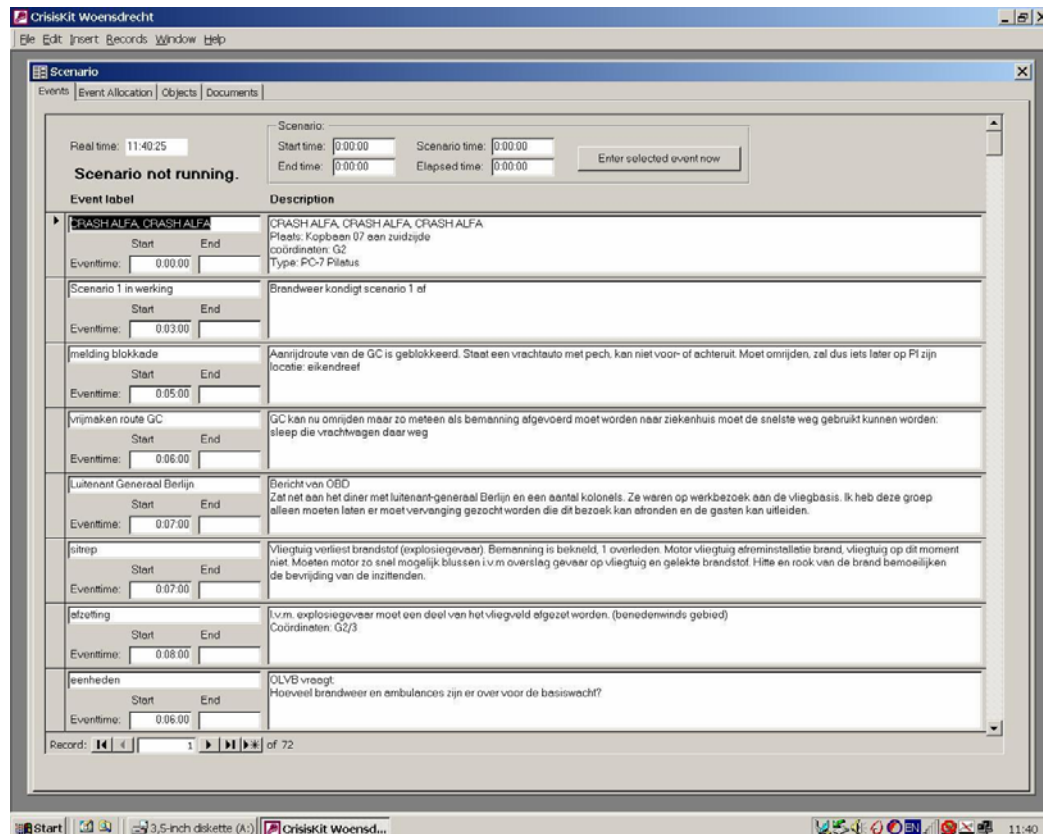
Event Based Training

We use the Event-Based Approach to Training (EBAT) to set up scenarios for exercises (Fowlkes, Oser & Salas, 1998; Oser, Gualtieri, Cannon-Bowers & Salas, 1999; Stroomer & Schaafstal, 2001; Van der Kleij & Schraagen, 2002a; 2002b). The primary goal of EBAT is to systematically provide opportunities for a training audience to develop important competencies. It allows teams to practice in simulated environments that are representative of realistic operational conditions, and it provides teams with performance-based feedback that is linked to specific events that occur during the training scenario. Figure 4 shows that EBAT links trainee needs, critical tasks, learning objectives, scenario design, performance measurement, and feedback. The general assumption of EBAT is that without a systematic linkage among these components there is no way of knowing or ensuring – with any degree of certainty – that the training will have its intended effect. The EBAT framework supports the design, development, execution, and evaluation of training scenarios. Because of the linkages in EBAT, performance can be traced directly back to specific objectives via events and performance measures.

Performance related to a given object can then be assessed and communicated to the training audience (Schaafstal & Post, 2002).

<u>Figure 4. Event Based Training</u>
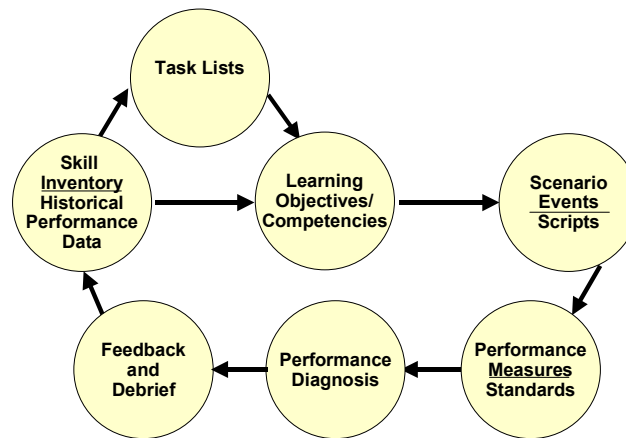
The Woensdrecht exercise
The air base Woensdrecht regularly practise within the framework of training emergency management. TNO Human Factors was asked to organise a training with CrisisKit for the emergency officers. The purpose of this training was to gain experience with the program and to consider the possibilities of using CrisisKit more regularly for the training and support of the air base emergency organisation.

For this exercise CrisisKit was adapted to the emergency management situation at the airport, which means we used the map of the airport as situation screen, included the emergency plan so it would be digitally available and a scenario was written based on the learning objectives of the team.

The scenario was developed with the use of four steps of the EBAT method:
1. Inventory of the skills needed in emergency management tasks. We used the companies' emergency plan for this inventory and held interviews with emergency officers.
2. Task analysis. Using the emergency plan and interviews held with emergency officers a list of tasks of the emergency officers was drawn up.
    The emergency management team consists of a commander, the captain of the team and the chiefs of the fire department, the security and the physicians. The position of the team is between the executives on the spot and the Operational Co-ordination Centre (OCC). The main task of the team is to filter out information for the OCC. Examples of other tasks are structuring requests and organising a lot of small things.
3. Learning objectives / competencies. Learning objectives tell what a trainee should learn during a training. Learning objectives are task specific and competencies are more general skills. Air base Woensdrecht has developed these learning objectives and competencies.
4. Development of the scenario. For each learning goal multiple events in the scenario were made. The events based on the same learning goal were different in difficulty and were presented at different moments in the scenario. The scenario events were made in consultation with experts of the air base Woensdrecht. The exercise consisted of all the events, placed in a timeframe.

The developed scenario was implemented in CrisisKit and was used as a basis for the exercise. Role-players from the higher (OCC) and lower control (executives on the spot) were used to respond to the requests of the team of emergency managers or to make requests. This interaction made the scenario realistic.

Before the real exercise started the emergency officers and the role-players were trained in the use of CrisisKit. The possibilities of CrisisKit and NetMeeting were explained and a short scenario was played. This was not a realistic scenario; it was made to practice responding to events and to practice exchanging information with other people.

During the exercise the role-players and the emergency officers were in a different room. Through NetMeeting requests could be sent from the role-players to the emergency officers and vice versa. The role-players could consult each other before sending a request or answering to a request. The emergency officers responded to the events and the requests in three ways: forward the message, solve the problem mentioned in the message, or not respond at all. Figure five below is an illustration of an emergency officer using CrisisKit during the exercise.

Figure 5. An emergency officer during the exercise

Findings and discussion

After the exercise CrisisKit was evaluated as a tool for training and as a support tool. This evaluation was done both by the emergency officers who used the program and by TNO employees who observed during the exercise.

CrisisKit as a tool for training has several advantages. First of all it can reduce the workload of the experiment leader. During the preparation of an exercise event distribution can be computerised, the moment the scenario starts everything will automatically evolve. It is however possible for the experiment leader to interfere in the scenario, events can be added or the allocated time can be adjusted based on the reactions of the team members. This computerisation makes it possible to decrease the size of the training staff and it gives the experiment leader more time for other things such as roll-playing or observation. Another advantage of computerised event distribution is that the timing of an event is logged, which can be practical during the debrief. For example based on this information it can be determined

based on what information a decision is made, or what information should have been shared or is missed even though it was available. Using chat or e-mail to communicate between teams also provides a logging of information sharing.

The exercise can be seen as a usability test for CrisisKit as a support tool. The emergency managers had an opportunity to test possible support tools for the future. After the training how to use CrisisKit everyone was able to use the program. The support focused on the four major tasks in emergency management: problem assessment, planning and decision making, situation awareness and direction and control. It turned out that not all the available support was needed for the tasks the emergency team had to perform and as a result, not all the support was used during this exercise. The situation screen was used the most during the exercise to form a shared situation awareness. The experts thought CrisisKit to have possibilities to use in the future as an extra support tool. At the moment it will, however, not be able to replace the existing work method. It was mentioned for example that, because the telephone could not be used, this exercise was not representative for a real crisis. On the other hand as a positive consequence they mentioned that because the phone was not ringing, the situation in the room was less chaotic and the decision making process more structured. In the evaluation the expert users gave some suggestions for improvements. Most of them had to do with mutual information sharing for example implementing e-mail in the application so they would not have to switch between applications or a 'you have got mail' message. There were also some suggestions to improve the existing support in CrisisKit, for example a zoom function in the situation screen or feedback on which events were read. The third kind of improvements they mentioned were extra support possibilities which they considered useful for example a taskbox, in which tasks can be parked that can be postponed till later.

To summarise: CrisisKit as a tool for training has especially advantages for the training staff and as a support tool it has potential to give extra support during an emergency, provided that it is adjusted.

Biography
Richelle van Rijk received her M.Sc. degree in cognitive psychology from the University Maastricht, the Netherlands, in 2000. Her master's thesis centred on a support concept for teamplanning in a naval setting. Since 2000 she works at TNO Human Factors. Until 2003 she worked as a research scientist at the department of Group Work where her main ideas of interest were decision making, crisismanagement support and distributed collaboration. She was involved in the development of CrisisKit, a decision making support tool for crisismanagement. Two examples of projects in the area of distributed collaboration she particpated in are the VIRTUE project, which aimed to develop the optimal videoconferencing system and a project in which an inventory of the success factors of distributed collaboration was made. She was also involved in a knowledge elicitation project for the forensic institute in The Netherlands. Currently she works as a research scientist at the department of Training and Instruction, where her main idea of interest is team training among others in the area of crisismanagement. An example of a recent project is the exercise in which CrisisKit was used as a training and support tool in a disaster management exercise at the air base Woensdrecht.

Josefien Zwartenkot received her M.Sc. degree in Psychology (specialised in cognitive ergonomics) from the University Utrecht, the Netherlands, in 2002. Her master's thesis centred on timing of feedback in a dynamic task. Since 2002 she works at TNO Human Factors. Currently she is a research scientist with the department of training and instruction. She works in the area of team training, with a focus on simulated team members and emergency management teams. An example of a recent project in the area of team training is a project for the Royal Netherlands Navy in which the training of the Chief of the Watch and his team has to be optimised. Her master's thesis is an example of a project in the area of simulated team members, in which simulated team members gave feedback during or after learning a complex dynamic task. An example of a project in the area of emergency management teams is the

exercise in which CrisisKit, a decision making support tool for crisis management, was used as a training and support tool in a disaster management exercise at the air base Woensdrecht.

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