

Key Concepts for the Effective Use of Digitally Supported Table-Top Crisis Management Exercises

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ABSTRACT

Several researchers and contingency agencies have suggested good practices for crisis management exercises. Resource-constrained practitioners in the field report difficulties finding cost-efficient ways to maintain exercise cycles. This paper draws on experiences from working with professional crisis response coordinators who adapted material for table-top exercises to learning management systems, executed the exercises and evaluated team performance. This paper discusses the elimination of bottlenecks and unexpected benefits arising from more flexible exercise designs in terms of *synchrony*, *continuity*, and *location*. While these concepts capture the essence of the various opportunities for flexibility, they need some supporting features in the design of digital exercises. This paper argues for putting emphasis on the writing/speech dichotomy when analysing exercise designs from the perspective of the entire exercise life cycle, including evaluations and preparations for further exercises. Additionally, how requests for individual answers are planned appears to be an effective instrument for efficient exercise design and evaluation during the conducting of an exercise.

Keywords

Crisis Management Teams training, table-top exercises, exercise design, learning management systems.

INTRODUCTION

The COVID-19 pandemic has highlighted the need for preparedness for unforeseen disruptive events at all levels of society. Crisis management at local levels, such as municipalities and other organisations, has long been advocated by contingency agencies. Previous research has found that organisations face several obstacles to practicing crisis management as often as they wish (Magnusson et al., 2019a; van Laere and Lindblom, 2019), and such findings form the basis for this study. Our interpretation has not been that crisis response systems are the best tools to meet the training needs of local organisations, even if such systems play a role in many crisis management exercises. Rather, at the economic level of small municipalities, public bodies and many companies, there is a need to support exercise preparation management and implementation with affordable tools. Using learning management systems (LMSs) as prototype tools, the Swedish-Norwegian Interreg project *CriseIT 2* explored the use of exercise management tools to fit the requirements collected in a previous project (Magnusson et al., 2019b). Together with crisis management trainers, we designed (and they conducted) short crisis management exercises inspired by the common table-top format (Coppola, 2007; Salas et al., 2012) and supported by LMSs in parallel with other digital systems. Although table-top exercises cannot replace field exercises, they have proven to be valuable for role training, understanding contingency plans, and inter-organisational bridging, (Granåsen et al., 2019; Rotstein et al., 2007).

This paper represents an attempt to define what concepts have been essential in this confluence of requirements for exercises and for managing their planning and evaluation. The author was the lead researcher in most of the LMS-based exercises and therefore closely followed the planning and conduct of them, and engaged in the follow-up interviews in most cases. The perspective presented here has been discussed with the project team members and included in a joint report (Magnusson et al., 2021) for the whole *CriseIT 2* project, which contained several other streams, including virtual reality (VR) simulations to enhance table-top exercises, but these other streams are not discussed here. The key concepts for simple LMS-supported exercising are presented below with examples from the actual exercises planned and conducted to highlight the relevance of these concepts for the effective

utilisation of LMSs. More intricate and detailed terminology can certainly be developed – and admittedly was used during the empirical work related to this study. However, for the purpose of discussing how to tackle the main problems mentioned above, only significant design choices for simplified exercise designs are highlighted here. This is the primary contribution of this conceptual study for resource-constrained safety coordinators, and we conclude this paper with a call for more research into how long-term exercise planning can take advantage of the kinds of variations in exercise format that this conceptual framework invites.

RELATED WORK

The Swedish national contingency agency, MSB, describes large multi-actor distributed table-top (“seminar”) exercises as follows: “A major advantage of this is that the exercise is cost-effective, as it does not generate any travel costs, and that more people therefore have the opportunity to participate. [...] Another big difference is that the exercise can last for a long time, from a week to several months. It will then be up to each stakeholder to decide how many resources should be spent on the exercise” (MSB, 2017 [orig. 2014], p. 14, our translation). This relaxed attitude could possibly also be used in smaller exercises to get cycles of exercises rolling; the vision is then to bring on board individual trainees rather than whole organisations, which is a problem, among certain other problems, that has been highlighted by recent research. Following interviews with 19 crisis managers, Magnusson et al. (2019b) recounted major problems related to too few exercises taking place and that planning is complex and time-consuming: “Constructing a scenario takes time, as does finding a date that suits all or most of the intended trainees.” (p. 87). In particular, some branches of their organisations, such as management groups, did not engage in crisis management exercises often enough, as mentioned in the original interview report (Wik et al., 2017). Stern (2014) notes similar problems: managers’ “time and attention are scarce resources and competition for these are fierce. Time spent preparing for future crisis is time not spent on current challenges” and “leaders may be insecure about their ability to perform under crisis pressure and avoid the ‘hot seat’ in exercises” (pp. 11–12).

Magnusson et al. (2019b) outlined generic requirements for a digital tool for exercise management: “*Support an integrated exercise/training process from planning to execution and evaluation*” with multi-actor collaboration; support synchronous and asynchronous exercises; provide easy access; support reuse/copying of exercise content, and audio and video formats; and ensure low costs for public organisations – we may guess that this appeals to many companies as well (p. 93f). As LMSs are commonplace in schools, universities, and some companies, several of the opportunities offered by a system meeting such requirements can be explored using existing LMSs without developing prototype software (Bellström et al., 2020). Such systems have rather low barriers to entry for first-time users and can be used in the exercise itself. Furthermore, using existing systems makes it possible to carry out the planning of individual exercises in the LMS. This would also make it possible for a municipal safety coordinator to invite users across the municipal organisation for joint and even cross-border planning if companies or other municipalities were to participate. Because a learning platform is not only a file-sharing system that can facilitate the planning and preparation of the exercise, the material itself, such as text, photos and video snippets, can also be integrated into the workspace for the exercise. Tips to the trainer can be placed in modules that are not made visible to anyone other than the exercise planners or exercise leaders.

As an all-purpose education tool, the LMS is not intended to be used in real events. Therefore, such a tool does not need to be integrated with systems used in real crises, and it does not need to have the functionality possessed by such systems. However, exercises may involve the use of such systems. This approach, which was applied in our exercises where appropriate, can be seen as a response to the view that exercises should take place in the same system used in a real event (that would be one way of reading Premise 1 of Turoff et al., 2004; on the other hand, their “simple communication addition” [p. 7] to a computer-based training system in the late 1960s is similar to the LMS usage experimented with here). Organisations’ economic constraints and restrictions on the inter-organisational use of critical systems make real systems less appropriate as the backbone for supporting the exercise cycle for our target organisations (cf. FEMA, 2021, p. 4). However, information collected in an LMS during an exercise can potentially reveal an organisation’s security flaws. The organisations that participated in the LMS exercises (as mentioned in the Introduction) simply reminded the participants that no classified information should be disclosed.

The key concepts that will be discussed in this paper are not meant to pre-empt future discussions. As Kleiboer (1997, pp. 204f) concluded, “This brief review of classic and more recent literature suggests that there is no single, immutable set of principles and rules for designing an effective crisis simulation.” For a seminar-like table-top exercise, the same undoubtedly holds true. In this paper, the focus is narrowed down to table-top exercises facilitated by LMS; however, as will be shown, there are several design choices to play with when scheduling and designing exercises.

Because a crisis management team (CMT) exercise is, in essence, a training session to promote collaboration, one

possible way to discuss LMS use in CMT exercises would be to rely on research on team performance where teams work virtually. “Compared to co-located teams or traditional face-to-face teams, [...] virtual teams experience more challenging issues when working together. In particular, building trust among members” is a challenge discussed by Yu and Khazanchi (2019). The LMS use reported below is not meant to replace ordinary crisis tools, but rather to provide an overarching type of aid for the planning and evaluation processes, as well as for conducting the exercise.

For similar reasons, we do not compare our discussion with the four important sociotechnical conditions highlighted by Olson and Olson (2000) in their seminal article “Distance matters” on digitally supported distance work. Specifically, these conditions are common ground, coupling of work, collaboration readiness and collaboration technology readiness. They are strikingly relevant to the work of rapidly assembled crisis management groups, even when these groups meet physically. However, Olson and Olson found that common ground and dis-coupling of work provided the optimal conditions for distance work, but the coupling of work as much as the other three conditions are precisely what CMT rooms are meant to create and what CMT exercises are meant to facilitate and nurture. Thus, their findings cannot be applied directly to the focus of this paper (albeit they are applicable to parts of it like the planning phase of joint exercises by two or several organisations). Olson and Olson discuss what “key characteristics of face-to-face interaction” different technologies support, and even if these are relevant to the topic of this study, the present paper will present a coarser analysis as it tries to capture the interdependence between a table-top exercise script and the scheduling of a modularised version of the exercise. Furthermore, Olson and Olson (2000, p. 159–160), like many others, refer to Clark and Brennan (1991; Clark 1996) for media features that contribute to creating common ground. Not all media forms are relevant today. We will attempt to connect interaction types to scheduling and evaluation, and a broader brush was found to be effective in painting the essential features and for the practical sketching of exercise cycles when they are formed and used.

EMPIRICAL BASIS FOR THIS CONCEPTUAL STUDY

As Elmasllari (2019, p. 1306) points out, there is a need for user testing of systems under realistic conditions. The trials conducted with LMSs were not developed just for the sake of having some professional safety coordinators or security managers act on our behalf; rather, they were exercises already in the plans of the professionals who acted as trainers during these events. Thus, the trainees were real trainees, and the trainers were real trainers. Although a trainer would normally prepare PowerPoint presentations and any concomitant Word or PDF files, in this study, a researcher ensured that the contents appeared in an LMS and demonstrated different possible layouts for the trainers. In some cases, the trainer gradually took over some of the LMS preparation. The exercises were realistic, but the setting up was an explorative wayfinding effort between researchers and trainers, which is why we referred to them as pilot exercises. From April 2018 to November 2021, nine pilot exercises were conducted: PE-1 through PE-9. In 2021, we observed videoconference exercises conducted by a company that utilised other kinds of digital support tools after initially testing an LMS in two videoconference exercises in December 2020 (PE-7 and PE-8).

In addition, two discussion seminar exercises, DE-1 and DE-2 in February 2020 and April 2021, were held, and they involved stakeholders and experts from different organisations (Bellström et al., 2020; Pettersson and Venemyr, 2021). Under the leadership of one or several trainers, participants discussed each other’s or common crisis plans regarding a scenario that was identified as relevant for a joint rehearsal. Thus, these discussion seminars were scenario driven and did not differ much from ordinary table-top seminar exercises. As the project involved crisis response coordinators from two nations, we used this opportunity to conduct joint discussion seminars and simultaneously used an LMS to structure the exercises.

From the various examples practicing trainers brought to the designs of the LMS-supported exercises, a 4–6 modular layout seems very common. With reference to Flin (1996) and Kleiboer (1997), Berlin and Carlström (2015, p. 51) point out that “The smaller the exercise, the easier it is to record details, capture important processes and draw nuanced conclusions that can be transferred to the exercising organisations’ daily practice” (our translation). The exercises conducted within the project contained four to six modules, each of which contained several injects – in other words, tasks that trainees must complete (see Table 1 for the prototypical structure used).

The present study is a conceptual study. Therefore, we will not go into detail about the exercises, but a comprehensive summary of all exercises has not yet been published, so some basic data are provided in Table 2. Modules differed between different exercises but in general looked as shown in Table 1.

Data collected included e-mails, meeting notes, LMS course pages (i.e., exercises), observation notes, interview notes and recordings, and data from the LMS, namely inputs from participants and time stamps. The participants were aware of the dual purpose of exercise and research and gave consent for data use, and when in a few instances they did not, their data were not used. The project received ethical approval from the university’s ethics board.

Table 1. A generalised exercise content structure with six modules

Module	Contents
Module 1	– The backdrop for the scenario and a task called “Distribute and describe roles”
Module 2	– Possible consequences and measures in the short term; can be described per actor/function
Module 3	– Create an overall situation picture and an overall action plan
Module 4	– Specific actions (each participant or each participating function)
Module 5	– “Now a week has passed...”: new inject + “Reflect on how the situation has changed and what the two or three most important measures are for each role”
Module 6	– Joint evaluation; often oral but can include both individual written answers and discussion on an electronic board

Table 2. Data on LMS-supported exercises

Exercise	Units involved	Participants	Description
PE-0	Role play: Functions of a municipality M0	7	Project members (researchers and first responders) experience digital exercise. One module each half day for three days. No real-time interaction between participants.
PE-1	Org. K + client association	2	Security manager trains chairman of an association housed in organisation K’s premises. Scheduled as PE-0 but with one synchronous module (Module 3).
PE-2	1 function at M1 and M2	6*	Communication officers in two municipalities work on a bus accident. Six modules over three days, as in PE-0 and PE-1.
PE-3	Org. K + client association	2	Like PE-1 but with a new chairperson and stretched over five days (still only 3 days with activities: one module each half day).
PE-4	1 function at K + client association	5	Like PE-3 but involving more of K. 8 days became 12; security manager could at first not connect in the synchronous module.
PE-5	1 function at M3	4*	A single-occasion session originally planned as interorg. M4+M5 but as a date was never settled, trainer turned to municipality M3.
PE-6	Part of crisis team of K (3 functions)	5	Like PE-4 but with top managers; therefore, 12 days were assigned for the six modules.
DE-1	Discussion seminar with safety coordinators	10*	Participants from two countries gathered for a 1-day occasion, partly as two groups.
PE-7	One site organisation within company L	11	Videoconference for 2+ hours (a 4-module design).
PE-8	Another organisation within company L	15	Videoconference for 2+ hours (a 4-module design).
DE-2	Discussion seminar with safety coordinators and other crisis mgt staff	9	Videoconference but individual start before that. Participants from two countries discussed for six hours, partly as two groups.
PE-9	Crisis team of a unit located in another town than rest of K	7	Twelve days like PE-6 but with one asynchronous module divided into two distinct timeframes.

* Plus one trainer who was not a member of the CMT or function group. For DE-1, several observers were used and also contributed to the concluding discussion in plenum, while in DE-2, only non-contributing observers were used.

THREE BASIC DICHOTOMIES AND TWO SUPPLEMENTARY FEATURES

As discussed above, organisations face several obstacles to practicing crisis management as often as they wish, such as coordinating busy managers and the time-consuming process of exercise planning and follow-up. This section examines several features that can be used in the digitised design of table-top exercises. The implementation is discussed at the level of scheduling and provisions for inter-person interactivity.

Synchronous and **asynchronous** refer to how “simultaneous” the practitioners need to be in the exercise, in other words, how contemporaneously they act, and in particular, how synchronously they practice. Thus, synchronous exercises entail the possibility of immediate interaction among participants. Berlin and Carlström (2011) discuss sequential collaboration (one group takes over after another), parallel collaboration (simultaneously but without actual collaboration), and synchronous collaboration (“members of each organisation do not focus only on their own tasks but are also looking for opportunities to assist others with their tasks”; p. 162f). Inter-organisational collaboration is the very aim of exercises, but to not mix up a description of real crisis handling with a table-top design, it must be recognised that asynchronous training allows for this, too, even if all aspects of the demands during real events cannot be trained and assessed in such a format. For the kind of CMT we are focusing on here, that is, not professional emergency responders but a crisis group that might have one security manager in the CMT, it should furthermore be recognised that various individuals have different needs to read up on crisis management plans or other materials. Gonzalez showed through several experiments (e.g., 2012) that “Slow is Fast” and “Less Workload Helps Adaptation”, which we take as indication that asynchronous collaborative exercises also have real value in the maturing processes for each participant.

The concepts of **continuity** and **discontinuity** were introduced to deal with the scheduling of modules. The two concepts can mistakenly be assumed to be bound to synchronous and asynchronous formats, respectively. A seminar exercise, as well as a large field exercise, is often performed as a single coherent gathering. The steps in a seminar exercise are carried out without interruption (excluding breaks). Undeniable there are advantages to a focused morning for a seminar exercise, but as the interviews with safety coordinators reported by Magnusson et al. (2019b) indicate it is often difficult to find half a day during which everyone can participate. Stern (2014) laments the same problem. Therefore, it should be recognised that a synchronous exercise can alternatively be divided into shorter steps that are not carried out in an unbroken sequence, but instead at times when people can afford to leave their ordinary tasks.

When asynchronous elements are mentioned below, it is assumed that they have timeframes within which the participants can (should) perform the activity. If the participants are to be able to relate to each other’s responses to injects, then asynchronous modules must be provided with a deadline for each task. That way, comments provided by each participant (facts, assessments, risk estimates, questions for more information, suggestions for measures to be taken) can be used in the next module. However, these frames are much wider than what each module is expected to take for a participant. Even if the timeframes are scheduled edge to edge, a sequence of asynchronous modules is discontinuous because no individual participant will work through them in an uninterrupted sequence.

Finally, the distinction between **co-located** and **distributed** exercises is undoubtedly crucial. Natural co-location is normally not the case for managers with different functions (departments) in an organisation. Arranging seminar exercises is easier if the location is optional for each practitioner, i.e. the exercise is spatially “distributed”, which is the idea behind distance education. Just as for synchronous and asynchronous working methods, co-located and distributed working methods can be combined in the exercise as a whole. It is also conceivable that some participants may gather at one site, while others participate at a distance.

Flexible, as in “a flexible format for exercise”, is best understood as a relative term that can be used when comparing two possible exercise approaches: one approach, the more flexible one, has a greater degree of asynchronous, discontinuous and distributed elements than the other. Distance education is surely meant to provide flexibility, but as should be clear from the arguments above, in crisis exercises, there are three different dichotomies at play when balancing the particular needs of an exercise in collaborative decision-making (in particular rapid decision-making) against the available times for the target people to participate.

While the three dichotomies capture the essence of the variation in opportunities for flexibility, they need some supporting features to ensure that they materialise in exercises. The need for evaluation has been mentioned above. In general, evaluation is facilitated by written records of what took place during an exercise. Video recordings of a videoconference may help, but the time necessary to go through videos and make transcripts to ease scanning and to make quotations possible in a final report is daunting and fails to simplify the process. For an exercise based on the use of an LMS and asynchronous modules, written comments, uploaded pictures, etc., facilitate any after-action review, whether conducted immediately with the participants or later by a trainer as preparation for further exercises. It should also be noted that synchronous modules can be designed to leave written traces. For a team discussion of situational awareness, there should be some written notes on the mutually agreed-upon

understanding of the situation. However, an evaluator of the exercise may miss the very discussion leading up to whatever agreed-upon description has been reached by the CMT. With the permission of the professional trainers, in some exercises, we experimented with letting participants use text chats for synchronous discussions, and at least for smaller groups, this arrangement worked. The constraints are somewhat different from videoconferencing, but neither is as unconstrained as physical meetings, as will be discussed below.

The quantity of writing may thus vary, and although the response formats of **writing** and **speech** do not constitute a proper dichotomy even within a single module, they need to be considered when minimising the effort required to conduct and evaluate a specific exercise.

Writing can be used in synchronous modules for (joint) notation even when it is not used for immediate interactions, so **individual responses** can be used not only in asynchronous modules but also in synchronous modules that alter between individual writing (or other formats) and joint discussion of the individual inputs. Thus, while an asynchronous mode entails individual responses, synchronous modes do not preclude individual responses (for joint discussions or for trainers to evaluate). This is somewhat different from breakout rooms, where subgroups carry out parallel activities before meeting as a whole CMT again.

The following section details the planning process for such LMS-supported exercises and presents reflections on the exercises conducted in this study.

THE KEY CONCEPTS IN USE

The intention of this section is to show that exercises do not have to be classified as “either/or” along the dichotomies introduced above. Rather, the implementation of the modules in Table 1 with respect to *synchrony*, *continuity*, and *location* should really be an open-minded undertaking, balancing the need for more exercises and easier evaluation with the need to practise the exact format of a CMT meeting room.

One should not think that asynchronous elements are only suitable for self-study. Although it might seem as if participants must participate in an exercise concurrently to practice the typical CMT interplay – the fast interplay when all available data should be reviewed and action plans should be consulted and prescribed measures adapted to the situation – there are good reasons to calmly walk through alarm chains, staffing, possible sources of information, how these should be valued, and deliberations of who should do what if a certain manager is absent.

In a learning platform, the exercise scenario can be given together with a request to leave comments:

The head of security asks you to distribute roles to the participants from your departments (Human Resources, Communication, and Client Support).

Briefly describe each role (including your own) in terms of the area of responsibility and possible tasks in the short and long term.

Here, no demand for synchronous action is present. A new manager might spend more time on this task than others. Moreover, the task gives the trainer the chance to see who has submitted an answer and who may need a reminder the day before the exercise begins.

Furthermore, the answers can be made visible to all participants. This allows participants to begin to understand each other’s role interpretations. This can serve as the basis for an initial discussion once the exercise begins, or as we would like to put it, when the *synchronous part* of the exercise begins. Thus, asynchronous parts are integrated into the framework of a collaboration exercise.

In using the modular content structure outlined in Table 1, for Module 1, there is obviously the option to choose between asynchronous and synchronous layouts. Even for Module 2, one can decide on the need for simultaneous replies according to the participants’ opportunities or difficulties in participating simultaneously. However, for the sake of the demonstration, let us first imagine that Modules 2 and 3 can be implemented synchronously – perhaps because the organisation has a couple of days when its various departments will gather, and those who will participate in the exercise can therefore take the opportunity to run a session in the mornings before the joint activities start (this can contribute to good lunch discussions and thus increase engagement). The opportunity is thus used to simplify planning by scheduling the synchronous Modules 2 and 3 discontinuously. In Table 3, “Discont.” means that a participant does not have to participate in the next part immediately after participating in the current one (which is why Module 6’s continuity row is empty). Module 6 takes place a couple of days later, or maybe the week after, depending on how closely one can schedule Modules 4 and 5. The participants might gather again in person for the final evaluation, as they may be afraid that technology-mediated communication makes it more difficult to discuss any problems encountered during the previous modules.

Asynchronous modules’ timeframes should span a bit more than the ordinary workday not to be down-prioritised

by a busy manager. Even if the module is meant to take just 15-20 minutes, include 30 minutes before the start of the work day or half an hour of the lunch break, one manager suggested in an interview after an exercise (PE-6). That exercise was completely text based and only partially synchronous. As videoconferencing has become standard in the wake of the COVID-19 pandemic, discontinuous synchronous exercises in which participants can discuss and interact on a virtual whiteboard are easy to arrange in a piecemeal manner. In contexts in which exercise participants work relatively close to each other, the modules can be run in a meeting room before lunch over the course of a few days. An interesting side effect of such an arrangement showed up in PE-2, where the participants in one of the municipalities joined other people during lunch and thus spurred interest in exercising crisis management strategies: “They also got kind of involved in the whole process and asked at a later break, ‘Well, what have you done now in the exercise?’” (Interview after PE-2)

Table 3. Example of a mixed structure

Module	1	2	3	4	5	6
Synchrony	Async.	Sync. + ind.	Sync.	Async.	Async.	Sync. + ind.
Continuity	Discont.	Discont.	Discont.	Discont.	Discont.	—
Location	Distributed	Co-located	Co-located	Distributed	Distributed	Co-located

In the example in Table 3, the exercise management team planned both Modules 2 and 6 to begin with individual tasks (“+ ind.” on the synchrony row). The exercise participants enter their answers in the LMS, and then the discussions begin in real time when the exercise leader asks participants to develop their answers. Then, a general discussion can ensue. Several exercises showed that individual answers were perceived as something positive: they enabled reflection and learning at the individual level. This also reduced the risk of consensus emerging long before everyone had time to present their views. One experienced security manager and exercise leader expressed the benefit of preventing participants from seeing each other’s comments until after they left a comment: “It is good that the participants do not see what others are writing. If a manager writes first, the others will not write anything that deviates. There is *evidence* of what appears in each answer” (Trainer interviewed after PE-7 and PE-8; these 4-module distributed exercises were fully synchronous and continuous, but individual answers were required in two modules).

In Module 3, where overall situational awareness is to be negotiated, there is no need for an individual start because individual inputs have already been made in Module 2.

If there are no good opportunities to meet in person, the same exercise can have a more pronounced flexible approach, as shown in Table 4. In fact, several exercises were wholly distributed, including synchronous modules (PE-3, 4, 6, 7, 8, 9, DE-2). Before delving into this issue, one potentially nonobvious advantage of discontinuous exercises, whether asynchronous or synchronous, must be highlighted – namely, the ease of starting a module anew when an exercise does not go as planned.

Organisational learning and retake during discontinuous exercises

Sometimes, the actions taken during an exercise are far from optimal. At other times, it turns out that the role cast as given by the organisation’s crisis plan will not be effective in a real situation. Furthermore, the infrastructure might be unreliable. An example is provided here (from PE-4), showing that a discontinuous exercise approach can make an organisation acutely aware of these issues because the exercise can continue in parallel with normal activities.

Example: The value of engaging in exercises in parallel with ordinary activities

In an organisation based on membership, and therefore having an elected chairman and vice chairman as front figures, the vice chairman carried both the main responsibility for social activities and the role of crisis management leader, if there ever would be a need for such work. Had the exercise been carried out as a traditional seminar exercise where half a day was set aside and the relevant cooperating organisations and vice chairman sat around a table, no problems with the crisis plan would have been observed. In the exercise that was carried out based on one of the LMS systems used in this study, the scheduling was instead quite sparse, with sometimes half a day and sometimes several days between the modules. This made it possible for the exercise to be scheduled over a couple of weeks when the organisation had intensive member activities. During the exercise, it became clear that the person responsible for social activities could not simultaneously be responsible for the organisation’s

crisis management. This simple exercise led the organisation to revise its crisis plan.

Thus, even if they are in stark contrast to the speed sometimes needed during a real crisis, slow-paced exercises are real in a sense that a dedicated session for a whole exercise cannot be. The combination of training and ordinary work in a discontinuous exercise reveals certain weak points more effectively than dedicated exercise time.

Example: The value of conducting spatially distributed training exercises to test connectivity in different situations

The exercise leader from another participating organisation had problems connecting to the internet during a synchronous module (cf. Module 3 in Table 1). This failure could possibly be held against distributed forms of CMT exercises. However, it constituted an important lesson for this organisation. Later, the COVID-19 pandemic showed how important it is for crisis management to be carried out remotely. This example also shows that discontinuous exercises can lead to more varied locations for participants (even for one and the same person) and thus to more occasions to (accidentally) test connectivity under real-life conditions.

Example: The value of leeway for reconsideration and retake

The problems mentioned in the previous example led to a partial retake: the synchronous Module 3 and the following asynchronous module, Module 4, which was planned for the same day, were implemented again a week later. The subsequent modules were also postponed for a week. All this was arranged with a few emails. Arguably, the loose scheduling made this possible, even though several of the participants were new to the training format and to crisis exercises in general. They were confident enough to simply accept the new times proposed by the trainer and by us. The importance of being able to correct mistakes during exercises has been emphasised in the literature: “In connection with studies of traditional exercises, it emerged [among other things] that employees were seldom given the opportunity to correct mistakes in one and the same exercise. Such opportunities could have contributed to learning” (Berlin and Carlström, 2015, p. 493, our translation). It is noteworthy that the slow-paced overall design opens up opportunities for the “coached” exercises advocated by van Laere and Lindblom (2019, p. 43).

Thus, in conclusion, not adhering to a continuous format made swift rescheduling possible. The original schedule was also quickly established.

Speech or writing

An LMS allows for a multitude of file formats to be uploaded, and participants can be asked to leave responses in the form of annotated maps, pictures of inspected gauges and places, etc. However, for a CMT to function swiftly and recognise that table-top exercises are a kind of workshop for in-depth discussions about routines and contextual factors, the linguistic part of communication is a determining factor for how an exercise is designed. Table 4 includes a row indicating the form of linguistic communication that takes place. Here, the choice is mainly between writing and speech. Speech in a spatially distributed exercise could also be sign language if the channel includes a video feed in addition to audio.

Table 4. More flexible planning of the same exercise*

Module	1	2	3	4	5	6
Synchrony	Async.	Async.	Sync.	Async.	Async.	Sync.
Continuity	Discont.	Discont.	Discont.	Discont.	Discont.	—
Location	Distributed	Distributed	Co-located	Distributed	Distributed	Distributed
Writing/Speech	Writing	Writing	(see text)	Writing	Writing	Both

* Shaded cells are altered compared to the previous table. Three of the four changes make scheduling more flexible.

Written communication is always available for exercises with digital support from an LMS. This also applies to synchronous modules in which, through videoconferencing or co-location, speech is allowed to constitute the primary discussion medium. We have seen that in practice, videoconferencing unfortunately makes a discussion quite monologic, as only one person can speak at a time. This would not fit all types of discussions necessary for a CMT (or other intensive, co-located work; Olson and Olson, 2000, p. 146). From DE-1 with everyone present (co-located, synchronous), we noted the following:

“during the discussions within the two groups, it was noticeable that the discussion went back and forth between whole-group discussions and smaller parallel discussions between two or three members. Such spontaneous parallel discussions where everyone is still aware of every subdiscussion going on would be harder to conduct in a videoconference meeting, while not so difficult in a chat forum. With the corona pandemic and concomitant physical distancing, there is a need to investigate the dynamics of video discussion exercises.” (Pettersson and Venemyr, 2021, p. 3)

For the same reason, one should also investigate synchronous digital writing surfaces or chats for real-time discussions when participants are not gathered. Our experience shows that the discussion boards found in learning platforms and blog platforms should be avoided, as they are too slow. Each participant’s screen should be updated immediately and automatically. In fact, even for asynchronous modules, we found that some participants became irritated when they posted a comment on a colleague’s post only to discover that other participants had already commented on it. For synchronous written discussions (chats), some participants voiced a wish to have an oral synchronous discussion before any chat-based module takes place.

Carrying out synchronous discussions in writing also entails a great advantage when an evaluation is to take place. Documentation is very valuable both for the hot wash-up at the end of an exercise and for the exercise leaders’ compilation of an evaluation report after the exercise has ended. It also provides an opportunity for exercise participants to go through the exercise step by step afterwards to reflect on their own and others’ contributions to the management of the injects in the scenario. Since data have been obtained from research projects, participants’ views have not only been collected during the exercise itself, but also through interviews conducted after each exercise. A review of the exercise in the LMS, including the participants’ written contributions, was often used to support the interviewees’ memories. Some interviewees spontaneously expressed satisfaction with these moments of reflection.

When other systems were used in the exercises, for example, when a municipality’s communicators reported in the national incident systems, the participants noted this in the comment field for each inject to which such a reporting belonged (especially used in the municipality exercises PE-2 and PE-5). Writing is not the only possible mode here; status reports created according to organisation-specific templates can be uploaded together with comments from the participants, which facilitates evaluation. It also facilitates inter-organisational learning when the safety coordinators from co-exercising organisations can see how the other organisation’s crisis management looks and works in practice. Nevertheless, ordinary written comments in the LMS constitute good evidence. The trainer of PE-4,6,9, all with only Module 3 synchronous but without speech, was asked in follow-up interviews to what extent the written documentation helped in assessing to what degree the goals of the exercises were met. The trainer expressed satisfaction with the records, e.g. after PE-4: “When you look at the comments, you can see they have been met. Impressive that AA, BB, and CC, who have not done this before, managed to get a grip of it so quickly.” Regarding an extensive discussion in Module 3 in PE-9: “This I regard as very good guidance. Here, one can see the course of events and how they are thinking in this group. This is very valuable.”

DISCUSSION OF IMPLICATIONS FOR PRACTICE

The structural sketches presented above do not take into account all the work that goes into the exercise process. In particular, mailing lists should be established, and people must be invited. The first time an invitation is made for a new information technology (IT) system, a user account needs to be set up, the user must be informed about privacy rights and the password must be changed. There are problems here, of course. If several e-mails are sent in advance, this can be annoying. In addition, some participants do not read the instruction e-mail until the exercise begins. The asynchronous start in Table 3 and Table 4 can therefore be combined with an “official” start in a videoconference; those who need guidance will appear, and problems associated with login and introductions to the system’s functions and presentation of the exercise goals and scenario can be quickly solved. One organisation we studied went from having a slimmed-down online version of its pre-pandemic exercise structure to scheduling all online exercises in two phases by having a one-hour meeting with a review of the crisis plan a few days before the scenario-based part of the exercise. During the first occasion, videoconferencing and any other systems are used to ensure that the participants will be able to use these systems during the following occasion, i.e., during the exercise itself.

Thus, some degree of discontinuous design should almost always be considered for digitally supported table-top exercises. In our own experimentation, we used a module that opened before the exercise but within the exercise area in the LMS, where participants could write questions to the trainer and confirm participation. Confirmation may seem unnecessary since the systems still register each user’s activity; however, the purpose of confirmation is to determine, some days before the exercise begins, whether everyone is able to use the system’s comment function.

The authors of MSB (2017), cited in the Related Work section, tacitly assumed a discontinuous and even

asynchronous (inter-organisational) design when introducing the idea of “distributed seminar exercises”. With chat and videoconferencing now omnipresent, the word *distributed* does not imply anything for the choice within the other dichotomies. Asynchronous implies discontinuous design here as we presupposed interaction between participants. However, the concept of *discontinuous* in itself implies a strict modularisation of the exercises that can be used in both asynchronous and synchronous exercises, which is why this concept should be valued on its own by trainers designing exercises. For example, it must be possible to start a module without too much rehearsal of previous modules. On the other hand, explicit instructions can direct participants to relevant points in previous modules important for real crisis management and this can potentially increase the interest in self-evaluation activities, similar to what we saw in the interviews conducted as a retrospective review of the LMS.

It is true that for several of the exercises pursued discontinuously, some participants mentioned that they missed the pulse-raising feeling of fast-paced exercises. However, pulse-raising should not be sought at the expense of exercising at all. After PE-2, which was a synchronous exercise pursued discontinuously by the communication functions of two municipalities, the trainer wanted to launch a similar but continuous exercise with two other municipalities, but eventually gave up after a few months, as the two organisations could not agree on a time. Instead, yet another municipality within the trainer’s geographical area of safety coordination agreed to participate in the exercise with its four of communication staff, who had their offices close to each other (PE-5). This failure to set a date for two organisations willing to collaborate highlights again that scheduling exercises constitutes a problem and that the desire to practice “realistically” really constitutes a show-stopper. We could almost add PE-9 to the list of unrealised exercises. It was delayed by 1.5 years, but it was finally realised with only a couple of weeks’ notice. This illustrates, once again, the agility and versatility of our approach, especially considering the COVID-19 pandemic interlude, which was the direct (and repeated) reason for delay.

It should also be noted that the planning process, including the building up of the exercise material in an LMS, has worked discontinuously (but steadily, of course), both asynchronously and synchronously, distributed but sometimes co-located, and both in writing and over the phone and later in videoconferencing. One might speculate that involving some of the target participants in the planning process may make the group of trainees more open to pedestrian pace. In fact, planning an exercise and thinking through possible events and responses constitute a discussion seminar in slow-motion; for example, a crisis trainer interviewed by Wik et al. (2017) expressed that much is learned in planning an exercise.

The usefulness of comments and discussions in writing for post-exercise evaluations is highlighted in the last section. It is also interesting to see to what extent our trainers were able to reuse their LMS materials: much of the PE-2 structure was reused in PE-5; PE-1 was almost entirely repeated in PE-3 and expanded slightly in PE-4 and PE-6, which inspired new types of injects in DE-2 and PE-9. Synchronous PE-7 and PE-8 ran during consecutive days, but planning was facilitated by setting them up in parallel. The project has left a deliverable in the form of an incipient repository of recyclable crisis management exercises (in preparation for publication by colleagues of the author).

Limitations of this study

The trainers have not set up exercises themselves in the LMSs, even if such systems provide easy access for trainees. To design for attractive flexibility and simultaneously experience the benefit of reusing material and designing for good data harvest would require some familiarity with an LMS. However, building on exemplary exercise designs should not be difficult, and practice also makes perfect for trainers.

CONCLUSIONS AND FUTURE DIRECTIONS FOR RESEARCH

Resource-constrained practitioners in the field have reported problems in finding cost-efficient ways to maintain exercise cycles. Our analysis shows that traditional ways of conducting table-top exercises make even this simplified training format susceptible to bottlenecks. As an alternative, this paper showed that certain key concepts for flexible design can be utilised if one relies on such an everyday tool as an LMS for collaborative exercises.

The concepts presented are not radically novel, but this presentation strived to highlight, using examples from exercises planned and then conducted, their relevance for effective exercise cycle management. Flexibility was dissolved into quite, if not fully, independent concepts of *synchrony*, *continuity*, and *location*. Modularisation of exercises was used to apply different scheduling schemes playing on these concepts, but without dropping the quest for easy-to-evaluate exercises. For individual exercises there is a balance to strike between writing (convenient in the evaluation phase) and speech (convenient for the trainees), as well as between individual responses and discussions, even if neither pair really consists of mutually exclusive alternatives. Trainers find it useful to have inspect-able traces of discussions and individual thoughts. There is definitive evidence that retrospective visits to the LMS are appreciated by the trainees. In addition, trainers may be able to find flexible

ways to invite key actors to the planning phase for more engagement in crisis preparedness.

While the Discussion section hints at many practical ways to make use of a category of systems which is already well disseminated, available via web browsers, and easily used in conjunction with videoconferencing, there are several themes that can be better illuminated by research. Gonzalez (2012) was referred to earlier as supporting having introductory exercises at a slow pace. The present study indicates the need for more such studies, preferably related to the organisational ability to implement long-term exercise plans. Moreover, this study contributed examples that “realistic” cannot always mean a CMT booked off for half a day in solitude with only pre-planned injects from the outside. Furthermore, bearing in mind the demonstrated versatility of settling dates for exercises if these are allowed to be digested piecemeal, it would be extremely interesting to see to what extent the problem of single-event thinking could be mitigated by “luring” managers and other trainees into an asynchronous planning phase, that is, having them participate discontinuously without questioning their belief that real crisis exercises should always be pulse-raising. In addition, learning effects of such planning cycles would be interesting to measure, possibly using frameworks such as Computer Supported Reflective Learning (CSRL; Krogstie et al., 2013) with due adaptation for planning phase reflection, reflection in exercise and in hot wash-up, and post-exercise.

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