Assessment of Collaborative Crisis Management Capability by Generic Questions

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ABSTRACT

Societies need the ability to respond to crises such as terrorism, pandemics and natural disasters. Hence, it is essential to ensure that the capability of crisis management is attained, maintained, and developed. Since large crises cannot be handled by single organizations, collaborative crisis management capability is needed. The objective of this work was to provide support by an instrument for assessment of collaborative crisis management capability. The work was iteratively performed in a workgroup. The outcome was two templates with sets of generic questions, one for assessment of the actual capabilities and one for assessment of the preconditions of the capabilities. The templates mainly focus on assessment of collaborative crisis management capability. However, since the questions are generically formulated, they should be usable for assessments of any type of crisis management capability.

Keywords

Capability, crisis management, inter-organizational, validation

INTRODUCTION

Managing severe crises such as terrorism, pandemics, natural disasters, and other types of large scale accidents put significant demands on society. Since large scale crises cannot be handled by a single organization collaboration between actors is required to respond to the situation. Crisis management exercises are important measures for ensuring that the collaborative aspects of crisis management are attained, maintained, and developed (Borell and Eriksson, 2013).

A body of work has been performed to describe the collaborative capabilities that are needed for efficient crisis management. Hallberg et al. (2014) described eleven capabilities needed for crisis management in local community settings. Granåsen et al. (2019) identified nine themes of capabilities for inter-organizational crisis management. In the context of the aviation security community, Beaton et al. (2010) proposed 13 capabilities for joint crisis operations systems. Greenberg et al. (2016) identified capabilities in the context of disaster and oil spill responses, which they categorized as functional, managerial, and as capabilities that enable adaptability and flexibility. Olsén et al. (2020) identified 14 capabilities as critical for collaboration between organizations that jointly manage crises responses. These capabilities were divided into four core capabilities that constitute the actual crisis management, and further in six supporting, and four enabling capabilities that are critical for achieving and maintaining the core capabilities.

Even though the capabilities described in the literature are differently defined and based on various theoretical frameworks, they embrace important aspects of crisis management. However, to enable any set of capabilities to actually provide efficient support for evaluation of crisis management, either in the form of exercises or real crisis management efforts, a viable methodology for assessing performance with a focus on achieving the capabilities is needed.

General methodology for assessment comprises methods for data collection and analysis. Typical methods for data collection are questionnaires, interviews, observations, video recordings, recordings of communication, logging of data communication, and performance measures, e.g. performance time and frequency of actions (O'Brien and Charlton, 1996; Stanton et al., 2005). All these measures are applicable when the researcher has the possibility to prospectively plan the data collection before the evaluation, which is generally the case when crisis management exercises are assessed. However, crisis management assessments of actual events are mainly performed retrospectively after the event is completed, which means that the tool box with applicable methods for data collection is more limited. This was confirmed by analysis of data collected in a literature review of crisis management assessment, which showed that experience reports and other documentation was the main source of information for analysis of real crisis management efforts (Granåsen et al., 2019). Interviews and questionnaires were used for both types of assessments, while observations and recordings were mainly used for assessment of exercises.

Thematic analysis is a frequently used method for analyzing qualitative data, for example from interviews, questionnaires, observations, and document analyses. In principle, this means that the material is categorized into different themes (Braun and Clarke, 2006). Granåsen et al., (2019) found frequent use of Social Network Analysis (SNA) in evaluations of crisis management, which is a mathematical method that maps how communication is performed and identifies specific roles of different actors in the communication (Houghton et al., 2006).

The objective of the work presented in this paper was to develop an instrument in the form of generic questions to support assessments of collaborative crisis management capability. The instrument should be applicable to assessment of collaborative performance, that is, how well collaborative capabilities are achieved in exercises and operations.

METHOD

The work was performed by three researchers in three steps: exploration of possible alternatives, formulation of assessment questions, and refinement of the assessment questions. Step one was performed individually by each researcher generating an alternative set of questions. Step two and three were performed iteratively in the form of workshops where all three researchers participated.

Step one – Exploration of possible alternatives

As a starting point for the work, three alternatives for questions to assess collaborative crisis management capability were formulated.

Alternative 1: Formulation of generic questions. This started with thoughts about the critical incident technique formulated by Flanagan (1954), which emphasized the need to focus on the most important factors in order to succeed with an activity, as well as the most hampering factors. The ideas of Flanagan (1954) have been further elaborated to guide questions for elicitation of requirements and improve quality of service (Ölvingson, Hallberg, Timpka and Greenes, 2002).

Alternative 2: Mapping of established methodology for validation of crisis management and similar types of validations suggested in the literature. This resulted in more than 1 000 capability specific questions and specific methods for data collection for each question.

Alternative 3: A hierarchical task analysis approach, as suggested by Hollnagel (2012), was used to divide each capability into subtasks based on the capability descriptions. These subtasks were in turn divided into a second level of subtasks. Finally, questions were formulated to evaluate the achievement of capabilities according to these subtasks, which resulted in approximately 100 questions.

Step two - Formulation of assessment questions

By a number of iterations in the form of workshops, the three researchers categorized, validated and compared the material of the three alternatives. After a number of iterations this converged into categories of general themes of questions with relevance for assessment of crisis management capability. An insight from alternative two and three in step one was that formulating specific questions for each capability would lead to an assessment

methodology with too many questions, which in practical terms would be unusable as a guideline for any assessment. This illuminated the need to formulate generic questions, which would be applicable to assessment of any crisis management capability with focus on collaborative work. This resulted in a preliminary set of generic questions and follow-up questions with relevance for assessment of crisis management capabilities.

Furthermore, three important preconditions for achieving crisis management capabilities were identified in the literature. These were: routines, technical support systems, and competence. A number of generic questions for the preconditions of crisis management were accordingly formulated.

The result was two generic question templates, one for assessing crisis management capabilities and one for assessing preconditions of crisis management capability.

Step three - Refining the assessment questions

The final step consisted of refining the generic question templates. This was conducted by applying the questions to a number of capabilities, based on the framework by Olsén et al. (2020). This resulted in minor revisions of the questions in the templates.

RESULTS

Capability assessment examples found in the literature include both the capabilities themselves and the preconditions for the capabilities. Thereby, the work resulted in two templates of questions for assessment of crisis management capability. The first template contains questions about the extent to which the crisis management capabilities were achieved. The second template contains questions related to the preconditions for achieving the capabilities.

The two templates are described in separate sections below. Each description is complemented by a subsection describing the rationale for the included questions, where each question is exemplified by the capability described by Olsén et al. (2020) as *establish and share a common direction*.

Template one – Achievement of collaborative crisis management capabilities

The questions focus on assessment of *collaborative* crisis management capability. However, since the questions are generic, the same questions can in principle be used for validation of any crisis management capability. Therefore, the presentation of the questions in the template also follows a generic format. This means that the letter *c* within angle brackets <c> can be exchanged with the name of any capability.

Four questions and follow-up questions were identified to assess to what extent the crisis management capabilities were achieved.

1. To what extent was the capability <c> achieved?
   a. Describe situations when lessons can be learned regarding the capability.
   b. How important was the capability in different phases of the crisis response?
   c. How did the capability change during the crisis response?
2. In what respect did the capability to <c> work particularly well?
   a. What was/were the reason/s for this?
   b. What positive effects did this have?
3. In what respect was the capability to <c> insufficient?
   a. What was/were the reason/s for this?
   b. What negative effects did this have?
4. How can the capability to <c> be maintained and developed?

Rationale for questions on crisis management capability

This section describes identified rationales (italicized) for the questions of achievement regarding the crisis management capabilities.

1. To what extent was the capability to <c> achieved?

The rationale is to assess whether the capability occurred during the exercise or crisis management effort.

1.1 Describe situations when lessons can be learned regarding the capability.
The rationale is to obtain an understanding of the situations in the exercise, or actual crisis management effort, where the capability is required. This comprises colleting enough information about how the crisis management was performed, in order to make it possible to gather experiences and implement these into learning in the crisis management system. This can be achieved by descriptions of, for example, which work tasks or problems that could be solved, how the work was organized (number of personnel, division of labour, roles, etc.), used methodology (methods, processes, procedures, routines), available technical support systems (communication and information systems), and the competence and experience of the personnel. For example, to what extent was the capability to **establish and share a common direction** achieved?

1.2 How important was the capability in different phases of the crisis response?
The rationale is to obtain an understanding of the phases where the capability was most important for the crisis management effort. The importance of certain capabilities may vary between different phases of crisis management efforts.

1.3 How did the capability change during the crisis response?
The rationale is to obtain an understanding of how the capability changed during the crisis management. Achievement of certain capabilities may change between different phases of crisis management. One reason for this may be that the actors adapt their working methods or organization as a result of experiences from the exercise or crisis management effort. Such experiences can be important sources of knowledge to increase future capability.

2 In what respect did the capability to <c> work particularly well?
The rationale of this question is to create an understanding of what worked particularly well during the exercise or crisis management effort and therefore ensure that this will also work in future exercises or crisis management efforts. For example, in what respect did the capability to **establish and share a common direction** work particularly well?

2.1 What was the reason for this?
The rationale is to obtain an understanding about why certain aspects of the capability worked well.

2.2 What positive effects did this have?
The rationale is to obtain an understanding about why it is important to maintain these aspects of the capability.

3 In what respect was the capability to <c> insufficient?
The rationale is to obtain an understanding of what needs to be improved or developed in relation to the capability. For example, in what respect was the capability to **establish and share a common direction** insufficient?

3.1 What was the reason for this?
The rationale is to obtain an understanding about why certain aspects of the capability did not work properly.

3.2 What negative effects did this have?
The rationale is to obtain an understanding about why certain aspects of the capability need to be further developed and improved.

4 How can the capability to <c> be maintained and developed?
The rationale is to obtain suggestions for how the capability can be maintained and further developed. For example, how can the capability to **establish and share a common direction** be improved?

Validation template two – Preconditions for collaborative crisis management capabilities

Three main preconditions for crisis management capability were identified: routines, technical information systems, and competence. Important aspects were included for each precondition.

Routines comprises routines for collaboration between organizations. These include procedures for the organization of collaboration between actors involved in crisis management, for example how collaboration

should be activated and maintained, how a collaborative function should be created, how support of this function should be organized, how information is supposed to be exchanged between different actors, and lists with contact information to all involved actors. Routines can also include specific user instructions for certain communication systems, such as the use of certain communication groups in radio systems.

Technical support systems comprises different types of equipment and infrastructure that are needed for efficient collaboration during crisis management. This can, for example, comprise locations for collaborative staffs, communication systems (e.g. phones, chat, e-mail, radio communication systems, video conference systems), encryption solutions (for secure communication of confidential information), equipment for visualization (e.g. whiteboards, flip charts, maps, projectors, interactive whiteboards), and computerized support (e.g. word processors and spreadsheets, but also designated C2-systems).

Competence comprises several aspects of knowledge and skills that are needed for efficient crisis management, for example knowledge (of the crisis management system, use of routines, use of technical support systems, of how to handle the actual crisis), intellectual skills (e.g. the capability to plan and reflect on implemented actions), social skills (e.g. leadership, communication, cooperation), emotional competence (e.g. attitudes, norms, values), personal competence (e.g. accuracy, diligence, swiftness, reliance), and developmentally related competence (e.g. the ability to identify ways to develop the work) (Ellström, 1992).

The template was generically constructed according to the same pattern as the validation template for assessments of the capabilities. Thus, also in this template, <c> can be exchanged with any capability and <p> with any precondition. Further identified preconditions can also be inserted and replace <p> in the template. The template consists of four generic questions about preconditions for crisis management capabilities.

1. To what degree did the <p> needed for the capability <c> exist?

2. Were available <p> used to achieve the capability to <c>?

    2.1 If not, why?

3. Did available <p> work regarding the capability to <c>?

4. How can the <p> in relation to the capability to <c> be improved?

Rationale for questions on preconditions for crisis management

This section describes identified rationales for purposes and consequences (italicized) of the questions regarding the preconditions for crisis management. Each question is exemplified by the same capability as in template one, *establish and share a common direction*, and with the precondition *routines*.

1. To what degree did the <p> needed for the capability <c>exist?
   The rationale of this question is to create an understanding of whether a certain precondition for a capability existed or not. For example, to what degree did the **routines** needed for the capability **establish and share a common direction** exist?

2. Were available <p> used to achieve the capability <c>?
   The rationale of this question is to create an understanding of whether a certain precondition that was available for achieving a certain capability was used. For example, were available **routines** used to achieve the capability to **establish and share a common direction**?

    2.1 If not, why?
    The rationale of this question is to create an understanding of why a certain precondition for achieving a capability was not used, for example why available **routines** for having the capability to **establish and *share a common direction*** were not used. This is also important in the perspective of the crisis management system as a sociotechnical system, as human flexibility and adaptability may conceal deficiencies in the system.

3. Did available <p> work regarding the capability <c>?
   The rationale of this question is to create an understanding of whether a certain precondition for a capability did work. For example, did available **routines** work regarding the capability to **establish and share a common direction**?

4. How can <p> in relation to the capability <c> be improved?
   The rationale of this question is to create an understanding of how a certain capability that is needed to achieve a certain capability can be improved. For example, how can the **routines** in relation to the capability to **establish and share a common direction** be improved?

DISCUSSION

The ability to assess collaborative crisis management capability is critical, since both deficiencies and advantages that are identified during collaborative exercises can provide significant information for the development of the crisis management system, and may thus lead to enhanced crisis management capability. The aim of the questions proposed in this paper is to extract information of whether a certain capability is accomplished or not, to obtain an understanding of needs for improvement and of how improvements can be accomplished. Hence, obtained information should make it possible to direct the development of the crisis management system towards aspects with the best potential for improvement. This means that the validation templates should provide a requirements-oriented methodology for increasing and developing collaborative crisis management capability.

It may be advantageous to use the template with questions on preconditions for crisis management capability (routines, technical support systems and competence) even before the start of an exercise or in-between crises, for instance to collect information on whether there are enough routines, competence, and technical support systems to *compile and share an operational picture.* However, this is dependent on which capability the questions focus on as well as the circumstances of the exercise. It may, for example, not be evident if a precondition is satisfactorily fulfilled before it manifests, or fails to manifest, itself by its effects on the achievement of a capability in the exercise. The evaluation template with questions about the actual achievement of the crisis management capabilities should mainly be answered during or after an exercise.

Furthermore, the preconditions template also aimed to contribute to a deeper understanding of the meaning of problems related to the achievement of capabilities. The three preconditions *routines, technical support systems,* and *competence* were included because they were identified as relevant in the literature review about methodologies for validation of crisis management and provide a relatively simple way of envisioning the crisis management system as a sociotechnical system. However, since the template is generic, other preconditions that might be identified as relevant for a certain evaluation may very well replace or complement the present preconditions.

The crisis management system is a sociotechnical system, meaning that if a certain part of the system is identified as insufficient, this may be a consequence of deficiencies in other parts of the system. For example, a technical support system may be experienced as insufficient if the users have not received enough training or education on how to use the system. In contrast, deficiencies in a system may not be revealed if they are or concealed, i.e. compensated for, by human flexibility and adaptability.

The overall objective of the two templates is to provide a generic framework for assessment of collaborative crisis management capability and the required preconditions. Since the questions are generically formulated they should be usable for assessments of any type of crisis management exercise, i.e. independently of the purpose or form of the exercise. However, the questions may need to be adapted to fit specific exercises.

Since this is preliminary work, specific methodology for collecting information has not been devised, which means that the validation templates have not been empirically tested. However, the intention is primarily to utilize established methods for data collection, such as questionnaires, interviews with participants and observations (O'Brien and Charlton, 1996; Stanton et al., 2005). The choice of methods for data collection during collaborative exercises will largely be dependent on what resources are available for assessment as well as the availability of the exercise participants.

CONCLUSION

The ability to assess the capability of crisis management systems is essential, both for ensuring sufficient capability and for developing the ability. The two templates provide a set of generic questions that could be used to direct the focus of evaluations towards essential capabilities. This focus is, however, broader than the capabilities themselves since it also zooms in on critical aspects that constitute the prerequisites of the capabilities.

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