Enhancing Norway's Local Emergency Preparedness with Municipal Crisis Team Exercising

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ABSTRACT

This case study describes and discusses the outcomes of an emergency preparedness exercise designed to enhance team processes in a municipal crisis response team. The study presents the case of an emergency preparedness exercise simulating a cruise ship in distress in the High North. The exercise was facilitated by a cross-disciplinary team of faculty members and subject matter experts from emergency preparedness organizations. The results highlight the student assessment of the exercise and identify critical exercise design factors associated with enhanced learning, such as scenario realism, timely preparation, and regular practice. The core members of crisis response teams in municipalities invest limited time and resources in team training; thus, it is essential that their training is effective and grounded in relevant risk and vulnerability analyses and evidence-based problems in municipalities. The study recommends the development of competencies in local emergency response teams based on theoretical frameworks of experiential team learning and shared mental model research.

Keywords

Local emergency response, emergency preparedness exercises, team training, municipalities, shared mental models.

INTRODUCTION

Municipalities fulfill their inhabitants' basic needs, including education, health services, housing, community, and societal safety. Highly salient and potentially disruptive events, such as disasters and unexpected crisis situations, may significantly impact individuals, organizations, and local communities (Bundy et al., 2017). In small municipalities, this creates some challenges. For example, the workload of senior professionals in municipal crisis response teams is high in their primary roles because of a lack of personnel resources. Furthermore, the rotation of personnel in senior management roles and their limited operational experience add to these constraints (Bigley & Roberts, 2001). Consequently, the absence of appropriate staffing, maintenance, or training of these teams may exhibit a false notion of emergency preparedness (Lindell & Perry, 2003; Perry, 1991). The need for team training is amplified when crisis situations require new, creative, or highly skilled coordinated actions in time-sensitive situations (Lacarenza et al., 2018). In principle, members of local crisis response teams must be aware of their roles and possess the required knowledge and skills to interact adaptively, interdependently, and dynamically in solving crises (Roberts et al., 2021). Even a team of experts can fail if they lack effective cooperation, coordination, and communication skills (Salas et al., 2018).

Although previous studies reveal the contribution of collaborative exercises to learning in the emergency work of professional emergency personnel, more studies should examine the impact of such exercises on various aspects of the learning environment (Borodzicz & Van Haperen, 2002; Tena-Chollet et al., 2017). Emergency management exercises may prove to be useful tools for team experiential learning at the municipality level because they create a conversational space in which members can reflect on and discuss their experiences (Sinclair et al., 2012). Furthermore, due to the differences among municipalities' resources and preparedness, team experiential learning may include both experienced managers and novices and all the semi-professionals for whom preparedness responsibilities are a priority in their day-to-day management tasks.

The shared mental model is a widely recognized theoretical framework for presenting team training and performance in a wide range of organizational settings (Salas et al., 2008), such as naval operations (Espevik et al., 2011) and law enforcement (Espevik et al., 2021; Johnsen et al., 2016). Teamwork critically influences the interactions and performance of local crisis response teams (Eid et al., 2023). However, few studies have applied the shared mental model framework to examine the training of semi-professional local crisis response units.

Current research has focused on discussions of the value of emergency exercises, particularly for testing preparedness (e.g., Berlin & Carlström, 2015). Less attention has been paid to the value of exercise design in influencing participants' experiential learning (Elvegård & Andreassen, 2023). It is important for the training to be effective and grounded in evidence-based principles and practices, as the core members of crisis response teams in municipalities invest limited time and resources in team training. It is important to look at the conditions for organizational flexibility needed to cope effectively with complex, ambiguous, and unstable task environments.

This empirical case study explores how an emergency preparedness exercise enhances team processes in a municipal crisis response team. This study analyses an emergency management exercise performed for local municipality managers to prepare them for the role of being in a municipal crisis management team.

In the following section, we first provide a contextual description of how the local municipal and regional system in Norway mobilizes, acts, and interacts with each other to address a local disaster in one or more municipalities. Subsequently, we present the theoretical background for the study and method, including a description of the case of the emergency preparedness management exercise "Vestfjord" and experiences from its implementation. The results are presented and discussed, considering the experienced team processes and the exercise design factors that promote learning. Finally, we draw conclusions on the impact of the exercise on team training and performance.

CONTEXT OF LOCAL MUNICIPALITY EMERGENCY MANAGEMENT IN NORWAY

In Norway, emergency management preparedness is organized at national, regional, and local levels. Each local municipality is obliged by the Civil Protection Law to identify possible undesirable incidents, assess their probabilities, and determine their possible effects on the municipality (Ministry of Justice and Public Security, 2021). The county governor is responsible for the supervision and coordination of the emergency preparedness of the local municipality. Nationally, municipalities differ vastly in terms of emergency preparedness, resources, capacities, and expertise levels. All municipalities in Norway are required to develop local risk assessments and appropriate contingency plans to cope with potential risks, vulnerabilities, and hazards to the community. This is to assist in planning and preparing to avert or address potential local crisis situations (Ministry of Justice and Public Security, 2021).

The uncertainties and disruptive and cascading consequences of protracted risks, such as COVID-19, have prompted a need to emphasize resilience management (Pescaroli & Needham-Bennett, 2021). Resilience management refers to the political and operational capabilities to respond, adapt, recover, and learn from disruptive and threatening events (Pescaroli & Needham-Bennett, 2021). A fundamental aspect of resilience management is maintaining the local capacity to provide safety-critical services to the public, even amid uncertainty and disruption.

The emergency preparedness plan must contain an overview of preparedness measures, alarming lists, resource overviews, evacuation plans, and information for the public and the media. The emergency preparedness plan should be updated and revised at least once annually. The municipality should ensure that the plan is exercised regularly (Ministry of Justice and Public Security, 2021). Eid et al. (2023) emphasized that psychological, interpersonal, and contextual factors are crucial elements of local crisis leadership, which may either present as significant barriers or force multipliers, depending on how they are managed and developed through education and training.

Crisis response team members have key responsibilities and commitments in the day-to-day management of services provided by the municipality. Local municipality crisis management teams must deal with various types of emergencies and crises and act in their area of responsibility in accordance with civil protection laws.

Furthermore, personnel in small municipalities may have multiple roles and responsibilities. An overview of the roles of a typical crisis management team in a small municipality in Norway is presented in Table 1.

Table 1. Municipality crisis team roles

Position	Stand in position	Function
Mayor	Deputy Mayor	Leader
Municipal Director	Deputy Municipal Director	Information Officer
Head of Nursing and Care Services	Head nurse	Evacuation officer
Public health nurse	Headmaster	Next of kin responsible
Municipal medical officer	Vacation	Medical Professional Advisor
Chief Technical officer	Supervisor	Resource responsibility

In addition, according to Section 43 of the Pollution Control Act, local authorities are responsible for establishing emergency preparedness for minor cases of acute pollution, which could occur and have adverse effects within their boundaries and which are not covered by private-sector measures (Norwegian Ministry of Climate and Environment, 1981). Norway's inter-municipal committees against acute pollution (IUAs) have a duty to respond and, when requested by the Norwegian Coastal Administration, to assist in national emergency response. Each IUA has its own approved contingency plan.

Regulations require the municipality to have a system for training that ensures that everyone who is intended for a role in the municipality's crisis management has sufficient qualifications (Prop. 91 L, 2009–2010). The municipalities have a key role as local coordinators through their duties to promote comprehensive and systematic civil protection work, a cross-sectoral perspective, and cooperation with other civil protection actors.

However, one concern is the insufficient time dedicated to training and enhancing the emergency preparedness of a crisis response team (Steinsund et al., 2023). The overall emergency preparedness plan must be exercised at least every two years to ensure the continuity of the municipality's emergency readiness (Prop. 91 L, 2009–2010). This frequency requirement pertains to participation in exercises, not necessarily to the municipality organizing them. Naturally, the minimum requirement does not preclude the municipality from conducting exercises more frequently.

The Norwegian Directorate for Civil Protection issued guidance on the regulation of municipal preparedness duties (DSB, 2018). Scenarios for emergency preparedness exercises should be derived from the municipality's comprehensive risk and vulnerability analysis. The municipality should, when appropriate, organize relevant exercises in collaboration with other municipalities and stakeholders.

Local communities in the Arctic are often remote with scarce infrastructure and may lack the capability to respond to a major disaster. Although accidents frequently have larger consequences, they happen locally, and local municipalities play a major role in preparedness and response efforts (Elvegård et al., 2024).

THEORETICAL BACKGROUND

Team Organization and Behaviors

Organization science literature suggests that the capacity to continuously and effectively manage, even in extremely hazardous and unpredictable conditions, is becoming a vital organizational quality or competency (Bigley & Roberts, 2001; Weick & Sutcliffe, 2011). When organizations engage in crisis response efforts outside their usual tasks, emergent teams form. Some will be well institutionalized, while others will include members who were not part of any planning exercises (Boin & Bynander, 2015). Wolbers et al. (2017) reviewed the underlying conditions of integrated emergent coordination, which are structured role systems required by actors, common expectations of workflow, and shared task knowledge. However, even with established structures and roles, it remains challenging to fully grasp the complexities of a new incident. Team processes can significantly impact situational awareness and the interdependence of their actions.

Teamwork behaviors are referred to as important prerequisites for effective team collaboration and the coordination of emergency responses. There are five behaviors of teamwork, also referred to as the "big five": team leadership, mutual performance monitoring, backup behavior, adaptability, and team orientation. To ensure that these components function, three coordinating mechanisms must be present. These are the development of shared mental models, the achievement of mutual trust, and engagement in closed-loop communication (Salas et al. 2005). These mechanisms are also needed to ensure that the necessary information is circulated in the team to make effective decisions. Both core components and coordinating mechanisms vary in practice as the team becomes more experienced and developed.

Salas et al. (2005) suggested that team leadership and team orientation components play a large role in teamwork. Team leadership is important because the leader will need to set initial performance expectations and specify the members' roles and responsibilities. Team orientation is also needed to learn the strengths and challenges of each team member and the members' preferences for how tasks are completed. Members' team orientation will play a role in receiving and using performance feedback from the team leader and other team members.

Salas et al. (2005) further suggested that during initial development processes, performance expectations and interpersonal interactions will be set, and team members can then focus on becoming more proficient in performing their individual tasks and can begin to spend more time monitoring others' behaviors and providing backup behaviors (p. 589). The full range of human factors, including individual complex problem-solving, team dynamics and training, and the availability of normative structural guidance, is essential for effective crisis leadership (Eid et al., 2023).

Exercise Design and Learning

Emergency preparedness exercises are learning activities with the purpose of improving crisis management capabilities. Sinclair et al. (2012) claimed that exercising is intended to develop people's capacity to respond to the demands of a disaster. Exercises are the primary tool for enhancing the competence of crisis response units to coordinate their actions in uncertainty and complexity (Borodzicz & van Haperen, 2002). These coordination processes are commonly planned and formalized as standard operating procedures, role assignments, and task descriptions. Previous studies have shown that collaboration exercises enhance learning for emergency personnel, but further research is needed to explore the specific elements of these exercises and their learning environments (Tena-Chollet et al., 2017).

To enhance the learning effects of exercise, a controlled, safe, and realistic environment is needed to capture the complexity of real-world incidents in training experiences. Rolfe et al. (1998) argued that scenarios should be realistic enough to allow participants to recognize their roles and tasks and to experience what might occur in an actual event. Different types of exercises have different purposes for learning, levels of realism, and design. Discussion-based exercises involve guided discussions to familiarize participants with emergency plans, roles, and responsibilities. Functional or command-post exercises test situational awareness, coordination, command, and control among multi-agency centers. Full-scale exercises are conducted to test all major functions specified in the response plan (Tena-Chollet et al., 2017).

Exercise design refers to the pedagogical choices made when planning the content, methods, and learning strategies of the exercise (Andreassen et al., 2024; Elvegård & Andreassen, 2023). Exercises are important for gaining experience and are often seen in the literature as experiential learning. Kayes et al. (2005) reviewed nearly four decades of research and the theory of experiential learning and claimed that it provides an effective framework for understanding and managing the way teams learn from their experiences.

> To learn from its experience, a team must have members who can be involved and committed to the team and its purpose (concrete experience), who can engage in reflection and conversation about the team's experiences (reflective observation), who can engage in critical thinking about the team's work (abstract conceptualization), and who can make decisions and take action (active experimentation). (Kayes et al., 2005, p. 335).

Team effectiveness can progress if the learning efforts are directed into six aspects of team development: purpose, membership, role leadership, context, process, and action.

Emergency management exercises may be useful tools for team experiential learning, as they require the creation of a conversational space where members can reflect on and talk about their experiences together. Several studies have used an experiential learning framework to study the effectiveness of team learning in emergency preparedness exercises. Silenas et al. (2007) claimed that experiential learning exercises are an effective, inexpensive, and easily adapted tool for promoting multiple competencies in mass health emergency preparedness for students with varied backgrounds. Waring et al. (2021) investigated the components of emergency preparedness exercises that enhance practitioners' learning in emergency response. They provided evidence that

it is crucial for responders to have access to pre-exercise materials, including emergency plans and information from the exercise delivery team about the exercise's value and structure. Second, exercise realism, including the appropriate representation of the roles offered by the exercise team, allows practitioners to practice their roles and understand how they would be affected in an incident. Third, regular exercise is essential to prevent lessons from being forgotten.

METHOD

Study Design

A qualitative empirical case study design was adopted for this exploratory study. The case study approach is particularly suited for providing a comprehensive, holistic, and in-depth investigation in the context of a complex issue, where the boundary between the context and issue is unclear and contains numerous variables (Harrison et al., 2017). Empirical data, including researcher observations, student assessments, and observer ratings, were collected during the planning, execution, and evaluation phases of the exercise. In addition to the observations from the exercise itself, the exercise design planning notes and observation notes from the exercise facilitators, anonymous online surveys from participants, and post hoc validation interviews with several participants contextualized and exemplified the exercise outcomes.

Sample and Data Collection

Seventeen respondents (6 males and 11 females) participated in the exercise. All respondents (aged 33–58) had prior experience with public service, and more than 50% (10 out of 17) had previous or current experience with a crisis response unit in a Norwegian municipality. Regarding the participants' backgrounds, 41.2%, 23.5%, and 35.3% had none, up to three years, and over three years of experience, respectively.

Data were collected in three different formats: a) observational notes from the instructors during the exercise, b) an anonymous after-action survey addressing learning outcomes, team processes, and lessons learned, and c) a follow-up interview on the participants' perceptions of exercise delivery to gain an in-depth understanding of features that facilitated or hindered their learning about team processes and performance. A study by Danko (2019) claimed that the experiential leaning survey is a useful tool for exploring experiential learning practices in emergency management education due to its applicability of their teams' experiences to real-world professional concern.

The Case of the Exercise Vestfjord

Exercise Vestfjord was conducted at the Center for Crisis Management and Collaboration – Nordlab in Norway. Participants were enrolled as part-time students in the Executive Master's Program for municipality leaders at the University of Bergen, Norway. The exercise aimed to highlight the factors that affect team behavior and leadership in critical situations through a dynamic accident scenario threatening the municipality. The participants gained insights into how municipal leaders facilitated collaboration in their operational teams during crises alongside other agencies and organizations.

Tabletops and game exercises were selected to achieve the learning objectives. The tabletop exercise allowed the participants, through discussion and dialog, to gain a deeper understanding of their own and others' roles and responsibilities in a crisis response unit in a Norwegian municipality. Additionally, they gained knowledge about the different organizations involved in search and rescue (SAR) and oil spill responses.

The students were allocated into three crisis management teams for the neighboring municipalities: Værøy (679 inhabitants), Røst (550 inhabitants), and Moskenes (968 inhabitants) (Figure 1).

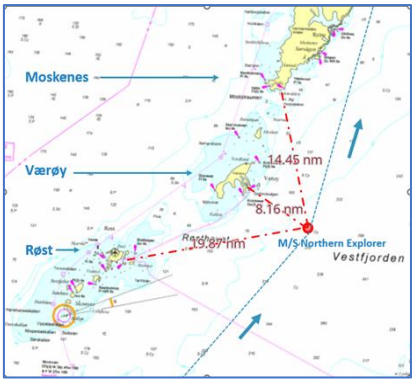

Figure 1. Map of Vestfjorden, showing the nearby municipalities Værøy, Røst, and Moskenes

The scenario commenced on May 25, 2023, with the cruise ship M/S Northern Explorer sailing from Bergen to Leknes in Lofoten, with 2,653 passengers and a crew of 1,203 on board. The crew belonged to 60 different nations, while the ship managers were mainly from Greece and South America. The incident occurred when the cruise ship received an indication of a fire in the generator room at 0830 local time (LT). At 0900 local time, Mayday was sent from M/S Northern Explorer in position 8 nm (approximately 15 km) east of Værøy. The weather in the area was a southeastern gale (18 m/s), waves of 3–6 m, and good visibility. This scenario was illustrated using a maritime simulator at the Center for Crisis Management and Collaboration – Nordlab (Figure 2).

Figure 2. Scenario development

The crisis management team gathered in the emergency rooms at the municipal buildings in Værøy, Røst, and Moskenes, with the mayors having received brief information from the chief of police in Bodø. They were informed that the Joint Rescue Coordination Center Norway estimated that the vessel could reach land within 5–8 hours, depending on the operating pattern and wind. The local rescue center was commissioned to establish a reception center at Værøy Island.

The scenario proceeded with various circulating rumors about the situation on board. Social media sites were flooded with stories about the incident unfolding in 8 nm east about the island Værøy. News channels were looking to contact the municipalities. Live updated images from the rescue helicopter SAR Queen were received at the Joint Rescue Coordination Center, confirming ship drift and smoke. Generally, there is little maritime activity in this area. Værøy, Røst, and Moskenes would hold a digital press conference to discuss the situation.

Furthermore, the vessel punched a hole in the port bunker tanks; as a result, approximately 500 m^3 of heavy fuel oil was discharged. The SAR operation was terminated, as no further danger to life or health prevailed. The responsibility for the accident site was handed over to the emergency department of the Norwegian Coastal Administration. The emergency preparedness director of the Norwegian Coastal Administration declared a governmental oil spill response operation.

The participants were divided into three groups belonging to three municipalities that set the team purpose, together with the task assignments (i.e., discussing the context and resources of the operation, organizing a crisis team, organizing a press conference, and reorganizing a crisis team with a new purpose). The exercise design included assignments for teamwork and reflection breaks with the course mentors, which allowed the team to diagnose its own process and connect reflection to the course literature. Subject matter experts were invited to join the discussion groups and provide feedback during the evaluation (Figure 3).

Figure 3. Subject matter experts and trainees in hot washup sessions after the game play exercise

FINDINGS

The results are discussed considering the participants' experiences with shared mental model training and the exercise design factors that promoted learning.

The Participants' Experiences of Shared Mental Model Training

The experienced processes were reported by the participants in the anonymous after-action survey addressing learning outcomes, team processes, and lessons learned. Team processes involved the key activities and priorities of the respondents. The results are structured according to the model of "big five" team components (Salas et al., 2005).

Team Leadership

Task distribution, clarification of the framework, team cooperation with other agencies, and understanding of team roles are significant components. Pressure on individuals in the crisis team regarding relevant tasks was a learning point.

Mutual Performance Monitoring

During a crisis response, it is useful to pause along the way to update each other in the crisis management team on their present status, accomplishments, and future tasks.

Backup Behavior

Supportive behavior is perceived as an important component of team behavior in crisis situations. The need for status meetings to create a feedback culture to provide team members with support and space was highlighted. Additionally, monitoring those who perform numerous tasks and require assistance is significant.

Adaptability

A simultaneous division of roles and flexibility was perceived as a useful component of team behavior. It is important to use previous experience and evaluations to adapt to team practice and include different team members in their own tasks.

Team Orientation

This component was considered important for distinguishing between those with responsibilities and those with leadership in different fields. Constant monitoring can assist in understanding each other's roles in crisis teams.

Exercise Design Factors That Promote Learning

The participants rated the learning effect of the exercise as 4.59 out of 5. Figure 4 depicts their perceptions of the fulfillment of the exercise learning outcomes. If a crisis occurs, they can rely on established plans, good internal and external cooperative relations, and self-experience from real events.

Figure 4. Student assessment of learning outcomes after the exercise Vestfjord

Based on the structure suggested by Waring et al. (2021), the investigated components of emergency preparedness exercises to improve practitioners' emergency response learning are related to preparation, including pre-exercise materials, plans and information, exercise realism, and opportunities for regular exercises. The following exercise design factors assist in promoting learning:

Preparation

The participants prepared for the exercise in advance and were provided with relevant materials, which was rated as (3.94 out of 5). They participated in a lecture series on varied topics during the exercise, including SAR in municipality management, oil spill response organization at the municipal level, organization of rescue sub-centers in police districts, the roles and responsibilities of local municipalities in the national preparedness system, journalism, and coordination with the media. They received an exercise information package containing the purpose and value of the exercise, planned learning outcomes, exercise structure, group division, timeline, and scenario. They also obtained documents for better context preparation: an overview of crisis management plans and team roles from the municipalities, geographical maps, and risk and vulnerability analyses for these municipalities. To maximize preparation, the feedback indicated the necessity of having materials for at least 2–3 weeks before the exercise.

Realism

The scenario and assignments were prepared following the relevant local municipalities' plans and information booklet (Værøy Municipality, 2017) and risk and vulnerabilities analysis for the municipality (Safetec, 2018). The lectures were delivered by subject matter experts from emergency preparedness organizations who ensured the realism of the scenario and the timeline of the operation. The participants' perceptions of the contribution of subject matter experts to their learning were very high. Their feedback was positive in gaining an in-depth understanding of the responsibilities of other organizations that collaborate with municipalities in such incidents (4.47 out of 5).

Regular practice

Exercise was part of the fourth session. Previously, the participants worked on two smaller assignments in the same groups regarding challenges in the context of a small municipality. One was case-based work, and the other involved creating one's own exercises. Both were established as experience-sharing and self-reflecting processes within the teams. As one of the informants reflected after the exercise, the participants felt more equipped; however, regular practice was considered more beneficial: "… we haven't practiced enough, we could have practiced more." Emergency preparedness exercises are valuable in emergency preparedness work because they help build culture, create trust, and train procedures. However, practice and training were assigned low priority by the participants, as often, too much time elapsed between each exercise practice session.

DISCUSSION

In line with Boin and Bynander (2015), a municipality's emergency management members, who exercised their roles within the crisis management team, formed a group with a predefined structure. However, they often perform novel tasks that they have not previously encountered or have only experienced to a limited extent. This may be seen as an illustrative case of extending the organizational structure. The role structure with the existence of bureaucratic routines and procedures may result from the teams' situated rationality (Bigley & Roberts, 2001). In line with this, it is important to have pre-defined role divisions and functional descriptions. This will help exercise teams with novel roles and responsibilities. Preparation for an exercise, including context understanding and role division materials, is an important factor for better learning about team behavior.

Conditions for organizational flexibility may be achieved through early identification of municipality context demands and plans (Bigley & Roberts, 2001). In our case, the first discussion assignment served as the instrument through which the team could understand the tasks and resource needs. Including such assignments as the first step in the exercise then contributes as a contextual factor of experiential team learning (Kayes et al., 2005). Flexibility may also be ensured by coordinating mechanisms for team behavior components – developing common mental models and creating trust and communication flow. Through working with and understanding other roles and information lines, communication becomes easier and leads to good cooperation.

Five team behavioral components were important in learning to exercise the role of the municipal crisis management team. Clarity in roles and division of responsibilities are crucial for superior local municipality emergency preparedness management, as well as for establishing trust and clarity in communication. Exercise design factors that promote learning assist team members in organizing themselves for exercising tasks that demand action planning and planning for constant monitoring and reflection breaks.

The shared mental model approach (Salas et al., 2005) emphasizes three coordinating mechanisms to ensure an even distribution of information within the team: the development of shared mental models, the achievement of mutual trust, and engagement in closed-loop communication. The following mechanisms are necessary to ensure that information is circulated within a team to make effective decisions: development of shared mental models, achievement of mutual trust, and engagement in closed-loop communication. The development of shared mental models is considered significant by participants working on a crisis management team. Shared situational awareness and mental models help clarify the common understanding of roles and responsibilities, thereby establishing a cohesive approach to managing crises. The mechanism of trust works through the clarification of roles and responsibilities. Establishing trust involves getting to know team members and sharing experiences. Closed-loop communication and feedback loops develop shared mental models, trust, and security in teamwork. Closed-loop communication positively enforces the understanding that everyone is equally important. Tasks are allocated as teamwork, and clear communication is crucial. Thus, providing feedback to each other and sharing experiences with colleagues are good practices for working in a team with a common situational understanding.

Continuous exercise leads to enhanced learning through exercise design components. Team leadership practices by individuals in relation to relevant task allocation may be useful in new teams and in the case of reorganizing tasks. The exercise design should define the roles and how team members can organize themselves. Mutual performance monitoring and supporting behavior are crucial to creating trust between team members; thus, it is important to focus on exercise. Exercise tasks demanding action planning from a team may ensure such behavior techniques. In our case discussion, breaks with mentors demanded action planning from the participants. Cross-collaboration with other agencies may help adaptability. Local municipality emergency preparedness management depends on mobilizing one's own resources and being able to draw on both intermunicipal cooperation and external resources. Collaboration and cooperation across municipalities and agencies are particularly important during crises. Experience and knowledge from other businesses can be useful in new contexts and functions when exercising the role. Constant monitoring and reflection in teams during the exercise may have a function in enhancing the learning of these components. Having knowledge of working in a team and being able to use that knowledge in new teams is an advantage.

CONCLUSION

This case study was conducted with local municipality managers. It analyzed the exercise design factors that enhance team learning and behavior to prepare participants for roles in a municipal crisis management team. This study contributes to the theoretical discussion on experiential team learning factors that promote the learning of team behavior components.

Current research literature has focused on discussions of the value of emergency exercises for testing preparedness (e.g., Berlin & Carlström, 2015). Less attention has been paid to examining the value of the exercise design that influences participant teams' experiential learning. Following exercise design factors promoting learning, described by Waring et al. (2021), which are preparation, realism, and regular exercises, for practicing roles in extending organizational structure, it is important to provide pre-exercise materials, including realistic risk and

vulnerability analysis for the relevant local municipality, information on the learning outcomes, and structure of the exercise. As the results demonstrate, the annual cycle for training, exercising, and evaluation is necessary for a deeper understanding of roles in an emergency management team. The study also confirmed the findings of Waring et al. (2021) on exercise design factors. In our case, pre-exercise materials, including realistic risk and vulnerability analysis for the relevant local municipality, information on the learning outcomes, and the structure of the exercise, were factors that promoted learning. Continuous exercise enhances learning. Moreover, for local municipalities to be better prepared to face unpredictability, continued work on various types of impact assessments and risk and vulnerability analyses is vital. This study contributes to the theoretical discussion of experiential team learning factors that promote learning of team behavior components in a setting of extending organizational structure.

The practical implication of this study lies in its recommendation of design factors for local municipal emergency preparedness exercises. The implications of this study can be discussed in further depth. Well-planned exercises can help municipalities build coping capacities and make them better equipped to face uncertain futures.

This was a single-case study, and its results may be applied to future research in the field. This study details an actual teaching exercise developed and conducted among local municipal professionals from Norway. The study was facilitated by participant interactions with a cross-disciplinary team of faculty members and subject matter experts from emergency preparation organizations. The study recommends the development of competencies in local emergency responses based on experiential team learning and shared mental model research.

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