Interdisciplinary Team Collaboration Within the Incident Command Post: A Case Study of Oslo and South-Eastern Norway

Ida Maria Haugstveit

Master of Philosophy in Psychology

Department of Psychology

University of Oslo

May 2012

Acknowledgments

Table of Contents

Abstract

The Norwegian Emergency Response Service is built on collaboration between public, private and voluntary organizations, with the police, the fire and rescue service and the ambulance service outlining the primary response units. The emergency response work involves interdisciplinary team collaboration between different units and between the operational commanders within the Incident Command Post. A common language and shared understanding of the situation is essential for emergency response teams to perform effectively and efficiently. The purpose of this study was to investigate to which degree a domain-specific and a generic framework of teamwork were able to account for statements made by operational commanders regarding interdisciplinary team collaboration. Semi-structured SWOT interviews were conducted with 17 operational commanders from Oslo and districts in South-Eastern Norway. Using a mixed model approach, the interviews were transcribed, unitized and coded into the categories of the two chosen frameworks. The results showed that neither the individual frameworks nor the combination of the two could account for all statements that were made by the operational commanders. A content analysis of the statements not accounted for by the frameworks yield several important themes that were regarded as important for teamwork and collaboration within the Incident Command Post. The results provide insight to the complexity involved in emergencies and in the emergency response work. Furthermore, the study can contribute to a better understanding of important aspect of teamwork within the work domain.

Interdisciplinary Team Collaboration Within the Incident Command Post:

A Case Study of Oslo and South-Eastern Norway

Emergency events and disasters have throughout decades received a substantial amount of attention from the media and from society. Emergencies often occur unexpectedly, at unpredictable places, and can have enormous consequences for individuals, property, the environment and society (Mendonça, Jefferson, & Harrald, 2007). Some examples of large scale emergencies from a Norwegian context are the collapse of the Alexander L. Kielland platform in 1980, the railway accident at Åsta in 2000, and the terror attack in Oslo an at Utøya in 2011.

All countries and societies have some sort of emergency response system, with the purpose of handling emergency events (Rake, 2008). Various agencies and a magnitude of individuals possessing complementary knowledge, skills and equipment are needed to handle the complex environment and tasks involved in emergency events. Therefore, interdisciplinary teams and teamwork is often the chosen strategy for the emergency response services. The use of teams and teamwork is often preferred when tasks are complex and difficult to solve, when the tasks cannot be accomplished by one individual alone, and when errors may lead to devastating consequences (Salas, Cooke, & Rosen, 2008).

Coordination of an emergency situation is essential for efficiently facilitating collaboration and cooperation within the emergency response team. In Norway, the act of coordinating an incident out in the field is the responsibility of the three operational commanders from the first response units; the police, the fire and rescue service, and the ambulance service. Together they constitute the incident command post (ICP), working together as an interdisciplinary team to ensure a shared understanding of the situation, and providing support and guidance for other emergency response workers. The performance of the operational commanders is often considered to be of key importance for the outcome of the emergency response work (Rake & Njåå, 2009). However, challenges may arise due to different educational programs, training, language, and norms that exist between the three units (Dougherty, 1992; Edmondson, 2003). This can in turn affect communication and the shared understanding of a situation. If such challenges are not addressed, it can have implications for the teamwork between the operational commanders within the IPC, thus lead to the possibility of an emergency incident not being handled efficiently.

The performance of emergency response workers is frequently the media's focus of interest when broadcasting news about emergency events. The media is often conflict and

problem orientated in their way of presenting information to the public. However, the media has a tendency to simplify the context under which the emergency response workers perform their job, and they often direct their attention towards individuals (Statkonsult, 2003). The media's critical point of view can cause malfunctions within the ICP team or the emergency response team in general, contributing to additional loss of efficiency.

Interdisciplinary team collaboration in within the ICP is the focus of this study. The study will investigate emergency response within a Norwegian context. In the following, aspects of the emergency response domain will be elaborated on, before the Norwegian emergency response service is described. Further on, a domain-specific frameworks and a generic model, both regarding teamwork, will be presented and debated according to four hypotheses.

The Complexity of Emergencies and Emergency Response

The following section will first provide a definition and several characteristics that are frequently used to describe emergency events, before features of the emergency response will be explained. This will be helpful in understanding the complexity involved in the emergency response work. There are many terms describing an emergency, for example disaster, large-scale event, crisis, extreme event, or catastrophe (Mendonça et al., 2007). However, emergency will be the term used in the present study.

An emergency can be defined as an event that has the potential to result in unwanted outcomes by threatening important values, such as people, property, or the environment (Mendonça et al., 2007; Solvic & Weber, 2002). Characteristics that can help identify an emergency situation are that the event occurs suddenly and unexpectedly, its exact course is unknown and unpredictable, and multiple actors are involved (Baker, Georgakopoulos, Schuster, Cassandra, & Cichocki, 1999; Mendonça et al., 2007). There is often a lack of control of the situation, the focus is on short term solutions because of time pressure and lack of information, and there is often an interest from outsiders (PBS 1, 2011). The interpretation of the term emergency can depend on the situation or on the judgment of individuals involved. The character and size of an emergency will depend on how large its consequences are, how fast the situation occurs and evolves, and how well society is prepared to handle the situation (NOU 2000:24, 2000).

The complexity of emergencies has implications for the management of such events. Individuals and agencies possessing a magnitude of complementary skills, knowledge,

competences, and expertise are needed to efficiently accomplish tasks. Thus, the emergency response service relies on the work contribution of a variety of disciplines, and can therefore be characterized as an interdisciplinary effort. The diverse composition of people within the emergency response service contributes to the emergency response work being complex. Different disciplines often have their own organizational structure, and the aligning of them all can at times be hard.

Emergency response workers work within a complex sociotechnical system due to the complexity of emergency events and the complex composition of people and agencies participating in the emergency response work (Perrow, 1999; Rasmussen, 1997). Complex systems concerns how people interact with various elements in their work surroundings, included the specific tasks, the environment, equipment, and each other. They also concern how this interaction affects task accomplishment (Arslan & Er, 2008). The intersection of how people, technology and the environment are interacting is termed Human Factors. It examines environmental, organizational and work characteristics of human interaction with systems, and the physiological and psychological characteristics that influence work behavior (Flin, Winter, Sarac, & Raduma, 2009).

This section has described what characterizes emergency events and emergency response, and how this features contribute to emergency response workers working within a complex sociotechnical system. The management of emergency events is often based on teams and teamwork, in order to combat the complexity involved in emergencies. The next section will elaborate on the term "team" and explain some specific elements of teamwork.

Emergency Response as a Team Effort

It is necessary to define what a team is, in order to understand the emergency response as a team effort. A team can be defined as two or more individuals with specified roles that are dependent of each other when interacting independently, adaptively, and dynamically toward a common and valued goal (Bang, 2008; Salas, Dickinson, Converse, & Tannenbaum, 1992). The definition of a team mainly addresses two important elements that are also true for emergency response teams: the existence of a common goal, and the interdependency between team members.

Team members of the emergency response service work towards a common goal when they perform their work tasks. The team goal is valued by the team members and should be of greater importance than team members' individual goals (Salas et al., 2005). Hence,

individual tasks and team tasks shall serve the team's shared goal. Saving lives is the number one priority and the common goal of the emergency response service, and all tasks performed shall be directed towards this common goal.

Team members are dependent of each other in order to achieve their common goal. Collaboration and cooperation between individuals and within and between agencies is essential in an environment where task demands shift throughout an incident (Mendonça et al., 2007; Salas et al., 2008). Collaboration is a teamwork process where members of different units or organizations work and communicate with each other to achieve common goals (Mendonça et al., 2007). Team members engaging in collaborative tasks are interdependent as they have a need to collaborate through different aspects of the team task (e.g. share relevant information so that others can complete their tasks) (Salas et al., 2005). Similarly, team members engaging in cooperative tasks are interdependent since failure in early stages of the task will have an effect on the ability for other team members to complete their tasks (e.g. fire fighters must secure a building before medical workers can go inside and look for possible patients) (Salas et al., 2005). Collaboration and cooperation in interdisciplinary teams can sometimes be hard to achieve, due to team members' different skills, references, experiences, and ways of defining and solving problems (Lichtenstein, Alexander, Jinnett, & Ullman, 1997). It is therefore important to note that coordination is essential for collaboration and cooperation to take place. Coordination is a group process defined as the management of interdependencies between activities, enabling people to work together harmoniously in achieving a common goal (Malone & Crowston, 1990). Coordination of the interdisciplinary emergency response team involves the management of multiple actors (Comfort & Kapucu, 2006). The act of coordinating is often performed by individuals holding leader functions within the organization. The coordination may for example involve joint decision making, division of resources, information sharing, and management of the incident in general (Gonzalez, 2008). Shared cognition or shared mental models are important in that they enable coordination through team members ability to anticipate each other's' responses in unexpected events (Weick, 1993; Weick & Roberts, 1993). Coordination takes place at different levels of the emergency response organization, for example at a strategic level, or out in the field at a tactical level. In addition, the different levels have to collaborate with each other in order to handle the situation effectively.

In short, emergency response is a team effort where the common goal of saving lives is achieved through team members collaborating and cooperating. The process of

coordination is essential to manage the interdependency of tasks performed by individuals and agencies during an incident. It is however important to note that emergency response teams function under certain contextual frames that might influence how teams and teamwork are structured and who holds the responsibility of for example coordination. It is therefore important to gain knowledge about the characteristics of a country and how its emergency response service is organized, when investigating concrete cases. The following section will therefore provide insight to emergency response within a Norwegian context.

The Norwegian Emergency Response Service

   This section will elaborate on emergency response in a Norwegian context. First, a description of geographical aspects of Norway will be provided, in order to understand what types of challenges the Norwegian emergency response service is faced with. Then it will be explained how the Norwegian emergency response service is organized at a national level. Finally, the first response units at a local level and the ICP will be described. The purpose of elaborating on the structure of the Norwegian emergency response is to illustrate the domain of the emergency response as an interdisciplinary team effort within a Norwegian context. It is also essential for thoroughly understanding the position of the operational commanders and the ICP within the organization's hierarchy. This organizational structure can also be regarded as a typical example of how national emergency response is structured (Rake, 2008).

   Geographical Aspects*:* It is important to note that geographical aspects of a country may influence the way emergency response services are organized, and what types of events emergency workers should be able to handle. The population of Norway is approximately 5 million, mostly located in urban areas, but with small populations spread throughout virtually all parts of its 384 802 km². Norway is a long and narrow country, with the main land measuring roughly 1,752 km in length, 430 km on its greatest width, and 63 km at its narrowest point (Minestry of Justice and Public Security, 1999). The landscape is characterized by woods, mountains, and an extensive coast line including bays, fjords, and islands, with a sometimes harsh climate. Offshore, Norway has 57 active oil and gas fields (The Ministry of Petrolium and Energy & Norwegian Petrolium Directorate, 2012). Typical examples of Norwegian emergencies are fires, floods, avalanches, transport accidents, and accidents in the petroleum industry (Rake, 2008). The geographical aspects of Norway represent challenges for the country's emergency response, in connection to what events it

should be capable of handling. The geographical aspects do also influence how the Norwegian emergency response service is organized.

Organization at a National Level. The Norwegian emergency response service is built on collaboration and cooperation between public, private and voluntary organizations and response agencies (Minestry of Justice and Public Security, 2008; Vigerust et al., 2009). This principle reflects that emergency response in Norway is based on interdisciplinary team collaboration, where different agencies contribute with a diverse set of skills, expertise, and equipment. The government is the supreme authority in the emergency response system, at a political level. In the case of large emergencies, the government is notified. The Ministry of Justice leads the emergency response at a national strategic level, unless another Ministry is appointed the responsibility (PBS 1, 2011). At the operational level, the Joint Rescue Coordination Centers (JRCC) has the overall operational responsibility during search and rescue operations (JRCC, 2012). Coordination occurs either from one of the two JRCCs situated in the southern and northern part of Norway respectively, or through one of the 28 Local Rescue Sub-centers (LRS). The JRCC and the LRS collaborate and cooperate with the local emergency response units at a tactical level. The tactical level consists of a diversity of divisions, all responsible of coordinating different tasks that are involved in an incident. The first response teams constitute one part of these divisions, working at the tactical level out in the field.

The First Response Units. The police, the fire and rescue service and the ambulance service outline the primary response units of the Norwegian Emergency Services. The three units at a local community level constitute the first response when an emergency event occurs. All expenses regarding for example personnel, equipment, training, and planning are to be paid for by the respective unit's budget (Minestry of Justice and Public Security, 2008). The three units have different responsibilities at an emergency scene. The *police* are in charge of organizing, leading, and coordinating the work effort (Lovdata, 1995; PBS 1, 2011). Thus, the police have the overall responsibility at the scene of an incident. Some of the police's specific tasks during an incident are to capturing and arresting potential perpetrators, conduct a registration of all who are involved, and notify relatives if people are hurt or wounded. The police are also in charge of putting up barriers for easier control of the scene, and provide information to the media about the incident (Minestry of Justice and Public Security, 2008). Nevertheless, saving lives is the police's number one priority, as it is for the entire emergency response service. The *fire and rescue service* will be in charge of an incident until the police

arrive. The responsibility of the fire and rescue service during an incident include saving lives, extinguishing fires, perform technical rescue work, and identify, monitor and handle dangerous substances. Thus, they are in charge of securing areas within their expertise (Lovdata, 2002; PBS 1, 2011). The *Ambulance Service* has the medical responsibility at an incident (Kozlowski & Klein, 2000; PBS 1, 2011). Their tasks include saving lives, offer physical and mental treatment for patients, prioritize patients through triage, and provide transportation to the hospital. The first response units work together as an interdisciplinary team, collaborating and cooperating to achieve their goal. Leadership at this tactical level of the operation is therefore needed, in order to coordinate the emergency response work force.

      The Incident Command Post. The ICP is the leading function out in the field when an incident occurs. It consists of an operational commander from each of the primary emergency response units; an incident commander from the police, a health operational commander, and a fire operational commander, all working together as a team. The ICP team has the responsibility for the overall functioning and coordination during an incident, and is in charge of maintaining a shared understanding of the situation. In addition, the ICP is responsible for making decisions, delegation of tasks, and leading, directing and controlling available personnel and resources (Rake & Njåå, 2009). It is important to note that the operational commanders should in theory not participate in the emergency work directly, but rather facilitate effective teamwork through the coordination of their respective units' work tasks, in connection with the interdisciplinary team tasks and their overall goal. Team leadership such as the ICP is essential to enabling teamwork, by combining and synchronizing individual team members' contribution to the team and its goals (Salas et al., 2005). It has also been suggested that efficient coordination of a scene can contribute to the media having a more positive view of how the emergency response service handled the situation (Statkonsult, 2003). The ICP is often established when an incident is long lasting and when an incident includes injured people, environmental spills, or damages on assets (Rake & Njåå, 2009). When large emergency events occur, ICP might also have the need to include external leaders to its team, from stake holding parties (e.g. the Coast Guard, the National Rail Administration) or other organizations that might be able to provide support (e.g. the Military Defense, the Red Cross).

      The work title "operational commander" is established differently in the cities and the districts. In larger cities of Norway (e.g. Oslo), the individuals possessing the role of operational commander have this as an established work title. Thus, if an incident occurs, they

are knowingly aware of their responsibility and work tasks. In comparison, the work title is not established to the same degree out in the districts of Norway. Here, the operational commander is normally appointed when an incident occurs. The individuals functioning as operational commander from their respective units should nevertheless have training and experience in how to lead at an incident (Minestry of Justice and Public Security, 2008). This difference in how the work title is established in the cities versus in the districts may have implications for teamwork within the IPC or in the emergency response service in general.

Summing up, geographical aspects of a country influence how the emergency response service is organized and structured. The Norwegian emergency response organization consists of several levels and divisions, with the police, the fire and rescue service and the ambulance service serving as the primary response units. The leading function out in the field is the ICP, consisting of an operational commander form each unit. The establishment of the ICP is essential at emergency incidents, to properly coordinate resources and keep an overall awareness of the situation. However, emergency response is a complex domain where specific actions need to be carried out, and where different aspects of teamwork are involved. In order to coordinate an emergency incident efficiently, it is essential that the individuals within the ICP are aware of the specific tasks of the emergency response service, and that they collaborate well with each other and with the other emergency response workers.

Teamwork: Domain-Specific or Generic?

There exist several frameworks outlining important aspects of teamwork. However there also exist some uncertainties regarding whether teamwork is domain-specific or generic. The question is: should teams and teamwork be seen in connection to its context, or are there aspects of teamwork that apply for all types of teams? It would be intriguing to investigate how well a domain-specific framework versus a generic model is able to capture the aspects of interdisciplinary team collaboration within the ICP. The results may contribute to the understanding of teams and teamwork in general and within the domain of emergency response. In the next two sections, two frameworks of teamwork will be presented. First, a domain-specific framework listing a set of team actions that are important to consider when an emergency event occurs, and secondly a generic teamwork model proposed to include important aspects of teams and teamwork, regardless of domain.

The FORSTÅTT Framework

The emergency units develop standard operating procedures (SOP), manuals, and guidelines for the management of certain events. The purpose is to provide a shared understanding of responsibilities and the pattern of actions involved in an incident. The emergency units have to a large degree operated according to separate manuals, were patterns of actions are described with different terms. This may have implications for the interdisciplinary team collaboration in the emergency response service and within the ICP, and can contribute to communication errors, misunderstandings, and wrong decisions being made. Furthermore, it may affect the overall effectiveness of the emergency response work.

FORSTÅTT is a domain-specific framework developed by the Norwegian Air Ambulance, listing important elements of emergency response work (Vigerust et al., 2009). The framework describes the pattern of actions taking place during an incident, and outlines what tasks should be carried out, by whom, and in what order. FORSTÅTT was developed in light of the need for a common understanding of the tasks and sequence of actions involved in an incident operation, and to provide a shared language and ease communication between emergency units during emergency events. It functions as an interdisciplinary SOP or check-list, and it is based on SOPs and manuals from different emergency units.

FORSTÅTT plays an important part in the Norwegian Air Ambulance's Interdisciplinary Emergency-Medical Collaboration course, TAS (Tverrfaglig Akuttmedisinsk Samarbeid). The TAS-courses emphasize and focus on collaboration and a common operative understanding between the police, the fire department and the ambulance service. The goal of the TAS-courses is to improve interdisciplinary collaboration and cooperation out in the field.

The FORSTÅTT framework consists of eight components describing essential actions and tasks that are to be carried out during an emergency event. In addition, it describes six phases of emergencies that are connected to the tasks. It is emphasized that even though the emergency units have different tasks to solve, the sequence of the components and phases is equal for all units. Figure 1 illustrates the eight elements of the FORSTÅTT framework, and its six phases.
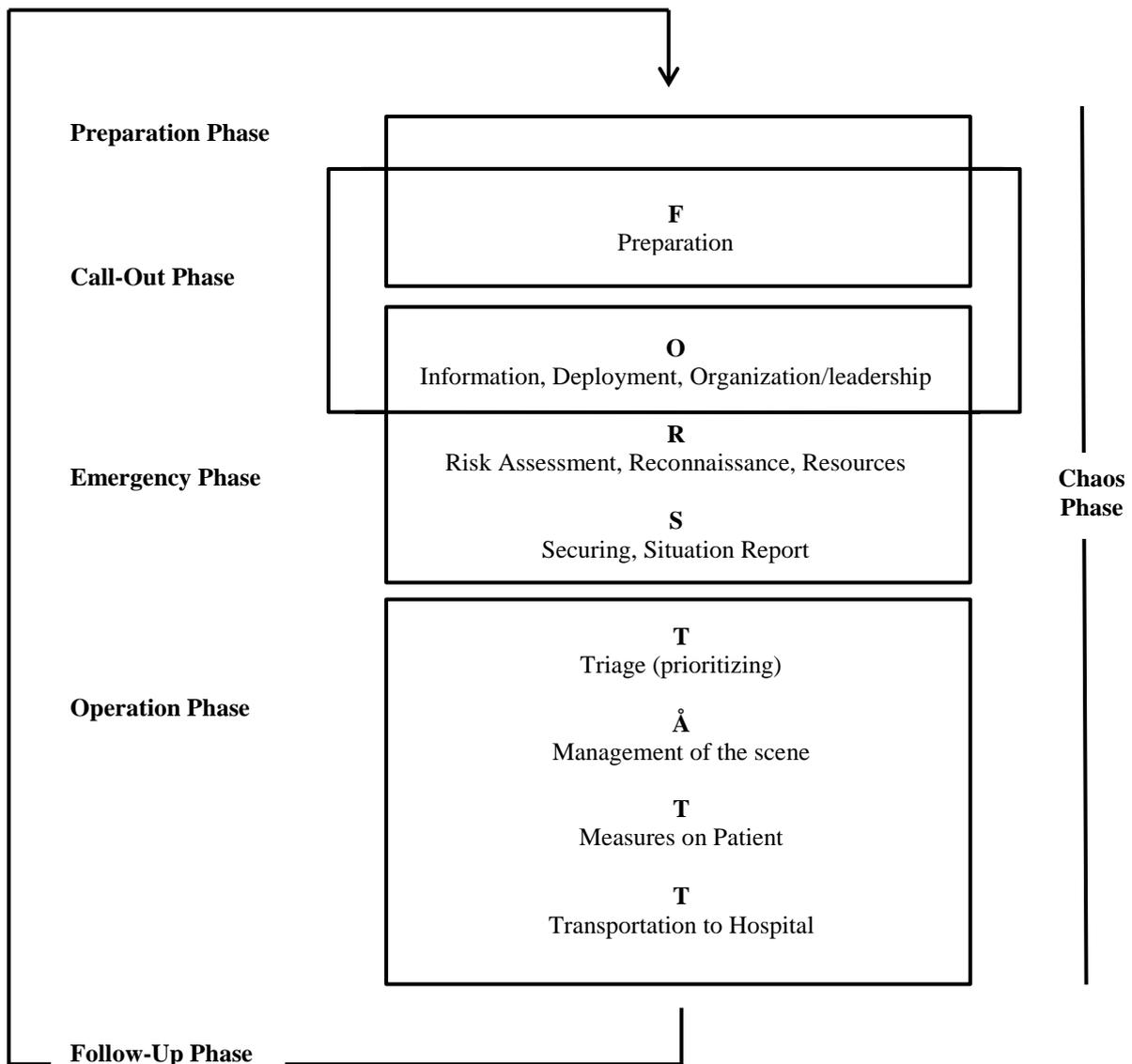
Figure 1. The relationship between the components and the phases of the FORSTÅTT framework.

FORSTÅTT is proposed as a sequential framework, thus the components follow in a sequential order. The eight components of the FORSTÅTT framework are described below, before a description of the phases will be provided, both based on Vigerust et al. (2009).

1. *F = Preparation (Forberedelse):* Be prepared for all types of events, and use existing professional knowledge and experience, including education and training. Consider what equipment and resources are needed, take weather conditions and the environment of the incident into account, and consider safety issues. Make plans and strategies for further performance, and establish contact with other leaders in ICP.

11

2. *O = Information, deployment, organization/management (Opplysninger, oppmarsj og organisering/ledelse):* Gather and provide information about the incident on the way to the scene, and communicate with the dispatch center. Be precautionary and request a sufficient amount of resources. Follow a deployment plan, and consider what will be an appropriate placement of vehicles and resources, in order to ensure an escape route. Establish the ICP and other management functions, and communicate clearly in the initial phase of the operation.

3. *R = Risk assessment, reconnaissance and resources (Risikovurdering, rekognosering og ressurser)*: Conduct a risk and safety assessments for oneself, others, the environment, and assets. Obtain an overview of the situation, and reconnaissance together with the operational commanders and other possible leaders. Be sure to understand each other's needs and not lose contact. Be proactive and acquire enough resources for the present and for the future, alert other emergency agencies and stakeholders, and consider their response time.

4. *S = Securing and situation report (Sikring og situasjonsforståelse):* Ensure the safety and secure against present and future threats. Consider future aspects and be proactive, not reactive and incident driven. Provide and obtain situation reports from the dispatch centers. Make sure to share and receive good, accurate and time-critical information. Adjust resources if needed.

5. *T = Triage (prioritizing) (Triage (prioritering)):* Prioritize patients, and ensure that everybody gets the right treatment at the right time. Prioritize saving lives first, and then consider the environment and material assets.

6. *Å = Management of the scene (Åstedshåndtering):* Continue with the operative work at the incident, maintain a good overview over the situation, and establish clear roles and responsibilities. It is essential to communicate, coordinate and control the scene. This is the time provide information to the media.

7. *T = Measures on patient (Tiltak på pasient):* Life-saving measures are the main priority for all agencies. After the triage, give physical and psychological first aid to all who are involved.

8. *T = Transportation to hospital (Transport til sykehus):* Start the transportation of patients to the hospital soon as possible. Contact the medical dispatch center when planning the transportation of patients. Establish collaboration between the patient assembly area and the evacuation control point.

In addition to the eight components of the FORSTÅTT framework, The Norwegian Air Ambulance defines six phases of an incident (Vigerust et al., 2009). The phases are not a direct part of the FORSTÅTT framework, rather they are supposed to be used as supplementary guidance when determine what components of the FORSTÅTT framework that should be focused on. Thus, to be aware of which phase one is in during an incident is important in order to determine what tasks, measures and actions that should be carried out. The phases follow in a sequential order, except from the chaos phase which can occur at any time of an incident. The first phase is called *the preparation phase* and starts before an incident occurs. It includes the acquisition of necessary education, training, experiences, and knowledge, for example about work responsibilities, procedures, specific action plans, and equipment. The second phase is called *the call-out phase*. It starts when an incident occurs and the alarm goes off, and ends when one arrives at the location of the incident. The third phase is called *the emergency phase*. It begins when one arrives at the incident, and continues until leadership and management has been established, one has an overview of the situation, and the rescue work has started. The fourth phase is called *the operation phase.* Here, there is a good situational overview, the management has been established and is functioning, and patients are being evacuated. The fifth phase is called *the follow-up phase* and starts when the medical work at the scene has ended. Emphasis is put on debriefings, and getting ready to respond to new incidents as soon as possible. *The chaos phase* can start at any time of an incident, and is referring to an individual's psychological state of mind. It is characterized by stress, tunnel vision, and loss of situational overview, which can have a negative effect on productivity. The time spent in the chaos phase will vary from individual to individual, and is highly related to work experience and training.

It may be important to note that the FORSTÅTT framework is not based on empirical research and it has not been reviewed (Vigerust, 2012). It may seem as if the framework puts little emphasis on how team members actually interact and works together, but rather explains the tasks and phases that are to be accomplished through teamwork. It could therefore be of interest to investigate the FORSTÅTT framework in comparison to a more established framework of teamwork, which can also be seen in connection with the emergency responce domain. In the next section, a generic teamwork model based on empirical research will be described.

The Big Five of Teamwork Model

        Salas and colleagues (2005) conducted an extensive literature review of studies of teams and teamwork from the past 20 years, in order to investigate what teamwork is. Their purpose was to uncover a model of important elements of teamwork. The review led to the development of the Big Five of Teamwork model, suggesting that there are five core components and three coordinating mechanisms that promote team effectiveness. The Big Five of Teamwork is a model intended to be of relevance for all types of teams and teamwork, regardless of tasks, organization, or domain (Salas et al., 2005). The model is parsimonious and generalizable, and it is suggested that it is be able to capture all aspects of teamwork that are relevant to a team (Salas et al., 2008). The Big Five of Teamwork model has been frequently cited and used for research in studies across a variety of domains (e.g. Beaubien & Baker, 2004; Kay, Maisonneuve, Yacef, & Reimann, 2006; Vestad, 2010). The five core components of the Big Five of Teamwork model are described below, based on Salas et al. (2005).

1. *Team leadership:* Direct and coordinate activities of other team members, assess team performance, assign tasks, develop team knowledge, skills and abilities, motivate team members, plan and organize, and establish a positive atmosphere.
2. *Mutual performance monitoring:* Develop common understandings of the team environment and apply appropriate task strategies to accurately monitor teammate performance.
3. *Back-up behavior:* Anticipate the other team members' needs through accurate knowledge about their responsibilities. This includes the ability to shift workload among members to achieve balance during high periods to workload or pressure.
4. *Adaptability:* Adjust strategies based on information gathered from the environment through the use of back-up behavior and reallocation of intra team resources. Altering a course of action or team repertoire in response to a changing condition.
5. *Team orientation:* Propensity to take others' behavior into account during group interaction and the belief in the importance of team goals over individual members' goals.

Salas and colleagues (2005) propose three coordinating mechanism in addition to the five core components. The coordinating mechanisms are needed in order to tie the value of each of the five core components together. Thus, while both the core components and the coordinating mechanisms constitute the Big Five of Teamwork model, the coordinating mechanisms function as facilitators of the core components and for effective teamwork. It can therefore be argued that the core components and the coordinating mechanisms outline separate aspects of the model. The three coordinating mechanisms of the Big Five of Teamwork model are described below, based on Salas et al. (2005).

1. *Shared mental models:* An organizing knowledge structure of the relationships among the tasks the team is engaged in and how team members will interact.
2. *Closed-loop communication:* The exchange of information between a sender and a receiver irrespective of the medium.
3. *Mutual trust:* The shared belief that team members will perform their roles and protect the interests of their teammates.

Interdependency between team members is a fundamental criterion for the Big Five of Teamwork model, and the completion of tasks relies on team members depending on each other (Salas et al., 2005). Salas and colleagues propose that the importance of the core components and the coordinating mechanisms will vary in early team task stages, while other components will be more distinct later, as the team and its tasks evolve. The Big Five of Teamwork model affects the team's effectiveness, based on how the five core components and the coordinating mechanisms are treated in the team. Salas and colleagues (2005) state that it will be useful to differentiate between team performance and team effectiveness. Team performance describes the multilevel process that appears as team members engage in their organizing their individual and shared tasks, and managing the teamwork process (Kozlowski & Klein, 2000). Thus, is refers to the outcome of the team's actions, regardless of how the team may have accomplished the task (Salas et al., 2005).Team effectiveness on the other hand considers how the team interacts to achieve the outcome and how the task was completed. Hence, team effectiveness considers how the team may have accomplished the task, and can be defined as the evaluation of the outcomes of the team performance (Hackman, 1987). Salas and colleagues (2005) suggest that in some cases measures of team performance can be inadequate due to external factors' effect on the team.

It is likely to think that the context under which a team functions will influence what aspects of teamwork that are regarded as important. It can therefore be questioned if it is suitable to suggest the idea of generic models applying for all types of teams, team tasks and within any organization. This issue has been raised by several researchers (Cannon-Bowers, Tannenbaum, Salas, & Volpe, 1995; Salas, Burke, & Cannon-Bowers, 2000). The focus on the debate has been that relevant aspects of teamwork have to be seen in connection with characteristics of the team, as for example the type of team, the team tasks, and the context it functions under.

The Present Study

The purpose of this study is to investigate how the FORSTÅTT framework and the Big Five of Teamwork model correspond with what operational commanders regard as important aspects of interdisciplinary team collaboration within ICP. Semi-structured interviews following a SWOT approach were conducted to gather operational commanders' reflections about interdisciplinary team collaboration. The method was chosen because it consists of open-ended and theory neutral questions, thus encouraging participants to talk freely about the domain. The interviews were transcribed, and meaningful statements were extracted from the transcriptions. Then the meaningful statements were coded in into the categories of the FORSTÅTT framework and the Big Five of Teamwork model. Statistical analyses were conducted, in addition to a content analysis to investigate statements that were not accounted for by any of the two frameworks. The method used for this study will be further elaborated on in the method section.

The FORSTÅTT framework developed by the Norwegian Air Ambulance (Vigerust et al., 2009) is a domain-specific framework describing a set of actions to consider when an emergency incident occurs. It is the only interdisciplinary SOP that exists in Norway, and should therefore be able to account for the majority of statements made in response to interdisciplinary team collaboration in the ICP.

Hypothesis 1: There is no significant difference between the total number of statements and the number of statements accounted for by the FORSTÅTT framework.

The Big Five of Teamwork model developed by Salas and colleagues (2005) is a framework of important core components and coordinating mechanisms important to teamwork. The model is generic and claims to be relevant for all types of teamwork, regardless of the type of team, tasks or organization. Therefore, the Big Five of Teamwork model should be able to account for the majority of statements made in response to interdisciplinary team collaboration in the ICP.

Hypothesis 2: There is no significant difference between the total number of statements and the number of statements accounted for by the Big Five of Teamwork model.

Since the FORSTÅTT framework is domain-specific and the Big Five of Teamwork model is a generic model, it is possible that the two frameworks will account for different aspects of interdisciplinary team collaboration in the ICP. Therefore, a combination of the frameworks might be able to account for more of the statements together, than either of the frameworks does separately.

Hypothesis 3: There is no significant difference between the total number of statement and the number of statements accounted for by the combination of the FORSTÅTT framework and the Big Five of Teamwork model.

Following the logic behind the previous hypotheses, statements that are not accounted for by the FORSTÅTT framework or the Big Five of Teamwork model should be irrelevant to the topic of interdisciplinary team collaboration.

Hypothesis 4: Statements that are not accounted for by the FORSTÅTT framework or the Big Five of Teamwork model are irrelevant to the topic of interdisciplinary team collaboration in ICP.

Method

SINTEF and the BRIDGE-project

      The study was done in connection to SINTEF's EU-founded project BRIDGE. The purpose of the BRIDGE-project is to develop technological and organizational solutions that can be used during emergency events, to improve management and coordination of the emergency response work (BRIDGE, 2012). Through this, the project's goal is to contribute to an efficient response to larger emergency incidents such as industrial accidents, natural disasters, and terror attacks, thus improve the safety of the population. BRIDGE focuses on collaboration between emergency response units and agencies, and across national borders.

Understanding the Domain

      Operational SOPs and manuals from the different emergency units were investigated (e.g. MOM, 2007; PBS 1, 2011), in addition to laws and official documents regarding the Norwegian emergency response service (e.g. Lovdata, 1995, 2000, 2002). This was done in order to understand the domain of interdisciplinary team collaboration in a Norwegian context. It provided an understanding about the emergency response service in general, for example about how the units are organized and structured separately, how they collaborate and cooperate with each other, and which jurisdictions that applies.

      A workshop was held at SINTEF in connection with the BRIDGE-project, in order to gather information about the emergency response domain, and about what technological devises that would be useful for the emergency response service. Participants were mainly emergency response workers from the three primary response units, in addition to a few other individuals with experience within the field. The participants freely discussed topics such as work roles and responsibilities, situation awareness, and decision making. They also got to see and comment on mockups that were presented. The workshop played an important part in understanding the domain of interdisciplinary team collaboration, through listening to the participants' reflections about their work domain and expressing aspects they considered important for collaboration between the units.

      The opportunity of spending a work-shift with one of the operational commanders of the Oslo Ambulance Service provided essential information to the understanding of the domain. This was highly useful in the process of understand the work and tasks of health operational commanders, and also gave insight in how the three emergency units and the ICP collaborate and work together out in the field.

Finally, the participation as an observer at a training exercise held by the LRS also played an important part in understanding the domain. Participants were the three local first response units, in addition to the military's Civil Defense and the Red Cross. The training exercise took place in Levanger, and imitated the scene of a bus that has run off the road and tipped. Observations of the training exercise provided an understanding of how the emergency response units work together, with each other and with other organizations responding to at an incident. It also gave insight in how the operational commanders from the three primary response units work together with leaders from other organizations. In addition, the training exercise provided an awareness of how the work title "operational commander" is established differently in the districts, compared to in larger cities.

Participants

Participants in the present study were individuals from the three Norwegian emergency units, with work experience as operational commanders. SINTEF helped with the recruitment of participants through their contact with informants. Participants were further on recruited through the "snowball effect", by informants providing names, numbers and e-mail addresses to colleagues they thought would be interested in participating in the study. A few participants were also recruited by calling or e-mailing them directly.

Interviews were conducted with a total of 17 operational leaders; 6 incident commanders from the police, 6 operational commanders from the fire and rescue service, and 5 operational commanders from the ambulance service. All participants had experience from Oslo or other places located in the south-eastern part of Norway. Of the 17 participants, 7 had work experience from Oslo while 10 had experience from districts in South-Eastern Norway. All participants were men. The informants had a mean work experience of 22.6 years ($R = 13 - 34$, $SD = 6.9$) within their respective units, and a mean experience as an operational commander of 11.5 years ($R = 2 - 33$, $SD = 7.5$). They were between the ages of 36 and 60 ($M = 47.7$, $SD = 7.4$), and 8 had participated in a TAS course, 8 had not participated, and 1 had participated in parts of the course.

Data Collection

Preparations: Interviews were the method used to gather data for this study, and were conducted by three interviewers. To ensure validity and reliability in qualitative research, proper training and preparation is critical (Krippendorff, 2004). The interviewers had all

participated in a 35 hour interview course. The course was based on the PEACE model (Clark & Milne, 2001) and gave insight and training in conducting SWOT interviews.

The Interviews: The interviews followed a SWOT approach. SWOT is a qualitative semi-structured interview method that examines strengths (S), weaknesses (W), opportunities (O) and threats (T) related to the topic. Questions are formed by connecting one of the SWOT elements to the topic of interest. Hence, there were four main questions, which in this interview concerned the topic of collaboration within ICP (for the interview guide, see Appendix A). In addition to the four main questions, further information was gained by providing supplementary questions that the participants could respond to (e.g. "You mentioned …, could you tell me a little more about that?", "Could you give me an example of that?"). SWOT questions identify the present situation through the questions of strengths and weaknesses, and the future situation through the questions of opportunities and threats (Chermack & Kasshanna, 2007). The SWOT approach is theory neutral and provides a way of structuring the interview without guiding participants in any direction. The questions are explorative and open-ended, thereby giving the informant the opportunity to provide his or her own thoughts and reflections about the topic.

Conducting the Interviews: All participants received an e-mail in advance of the interview, containing practical information about time and place, and an information letter including the purpose of the study, how the data would be used, and a list of interview questions (for the information letter, see Appendix B) . Interviews were conducted between the 7th of November and the 14th of December and lasted approximately 30min on average ($R = 16.19 - 46.38$). Most of the interviews were conducted during the participants' work hours and at their workplace, except for one interview conducted at SINTEF and one at a location where the participant was attending a meeting. Participants were interviewed separately by an interviewer, and with one observer present whose role was to take notes and contribute with follow-up questions. Two sets of interview questions were asked each participant, one related to the present study, and one related to another study made by a fellow student. The order in which the two interviews were conducted was distributed equally in relation to participants' work place and across units. All interviews were conducted in Norwegian to ensure that language barriers would not be a problem.

Analysis

The analyses were conducted following a mixed model approach. This approach is used to combine qualitative and quantitative research techniques, methods, and approaches, in one single study (Johnson & Onwuegbuzie, 2004). Thus, the method allows for legitimation of using multiple approaches when answering research questions, rather than restricting the choices of the researcher. It is suggested that mixed model research is able to grasp some complex research questions in a better manner than qualitative or quantitative research are able to alone (Lund, 2011).

In the present study, the qualitative data gathered through interviews were quantified. First, interviews were transcribed, and then meaningful statements were extracted from the transcriptions. Third, the meaningful statements were classified and coded according the categories of the FORSTÅTT framework and the Big Five of Teamwork model. Finally, statistical analyses and content analyses were conducted.

Transcriptions: All interviews were recorded on audio tape and transcribed word by word into text. Names, demographics and interruptions during the interview were not transcribed. After the transcriptions were completed, they were checked for errors by listening to the audio recordings once more while reading trough the transcribed text and correcting possible errors.

Unitizing: Transcripts were unitized into statement units and example units, based on thematic. Unitizing involves separating what informants have expressed into meaningful statement units (Hoff et al., 2009; Weber, 1990). A semantic definition of a statement was used: A statement is a unit large enough to carry meaning and small enough to be feasible (Krippendorff, 2004). Thus, a statement has to be large enough to be meaningful, yet small enough to contain only one theme. Where meaning starts and ends is what defines the boundaries of a statement (for unitizing procedure, see Appendix C). Statements classified as example units provided support for another statement, thus did not raise a new theme. This was done so that statements would not be too long. Statements that were about the participant's work, about collaboration, or in other ways relevant to interdisciplinary team collaboration in ICP were included in the analysis. Statements that were clearly irrelevant to the topic were excluded from the analysis together with hesitations and speech disfluencies (e.g. hmm, eeh) that were transcribed. This was done to maintain a focus on the topic in question. Unitizing of transcribed interviews was divided equally between the author and two fellow students. An inter-judge reliability test on the unitizing was conducted and showed a

reliability of 68 %. The test was based on Zarghooni's (2011) adaption of Boyatzis' (1998) percentage of agreement of presence (P.A.P.). The test was however modified in order to account for the inter-judge reliability between three unitizers. This was done by calculating the inter-judge reliability between unitizer A and B, unitizer A and C and unitizer B and C, before calculating the mean value of the three unitizers. For further description of inter-judge reliability for unitizing, see Zarghooni (2011).

Coding: All statements and example statements were imported to IBM SPSS Statistics 19 in a chronological order, with the purpose of not losing the connection between the units. Statement units were then coded according to the categories of the FORSTÅTT framework and the Big Five of Teamwork model. Categories were operationalized and defined based on definitions in the original articles (for operationalization of the FORSTÅTT frameworks, see Appendix D, and for operationalization of the Big Five of Teamwork model, see Appendix E). Example units were not coded, since they only provided support for another statement. In the Big Five of Teamwork model, statements were coded separately into the five core components and in the three coordinating mechanisms. This was done because while both the core components and the coordinating mechanisms constitute the Big Five of Teamwork model, they reflect different aspects of the model and the three coordinating mechanisms function as facilitators of the five core components in tying their values together (Salas et al., 2005). Hence, a statement could be coded as a core component and a coordinating mechanism, as one or the other, or as neither. In FORSTÅTT, statements were coded into the framework's components, and not into its phases. Statements that did not fit into a component of FORSTÅTT or Big Five of Teamwork were coded as residuals in the respective framework, meaning they were not accounted for.

Statistical and Content Analysis: After the statements were coded, statistical analyses were conducted. Paired-samples t-tests were run to test hypotheses 1, 2 and 3. In addition, effect sizes were calculated following Field (2005). A Bonnferroni correction was considered to counteract the problem of considering a set of statistical inferences simultaneously. This was however not done, based on Perneger (1998) stating that such a correction is unnecessary when assessing evidence about specific hypotheses. Statements coded as residuals were investigated qualitatively through a content analyses, in order to test hypothesis 4.

Ethical Considerations

All participants received and signed an informed consent form before the interview started. The form included that participation was voluntary, that it was possible to withdraw from the study at any time, permission for audio recording of the interview, and that all information would be treated confidentially (for the informed consent form, see Appendix F).

Due to the terror attack in Oslo and at Utøya 22nd of July 2011, SINTEF had been in contact with the 22nd of July Commission in connection with project-BRIDGE. This was done to not get in the way of their investigation of the terror attack. The Norwegian Social Science Data Services (NSD) was also contacted. Permission to do research was granted from both the 22nd of July Commission and NSD, including research for the present study.

Results

Descriptive Statistics

The transcribed interviews were unitized into 2279 statements ($M = 134.1$, $R = 72 - 243$, $SD = 44.9$). Out of these, 1652 were meaningful statements ($M = 97.2$, $R = 56 - 180$, $SD = 32.1$), and 627 were example statements ($M = 36.9$, $R = 7 - 63$, $SD = 15.9$). The 1652 meaningful statements were the foundation for the analysis, and were coded into the categories of the FORSTÅTT framework and the Big Five of Teamwork model.

The FORSTÅTT framework accounted for a total of 1081 statements or 65.4 % of the statements ($M = 63.6$, $SD = 24.0$). The distribution of statements across the FORSTÅTT components is presented in Table 1. Table 1 shows that statements are not evenly distributed between the FORSTÅTT categories. *Preparation* holds the highest number of scores, including 408 (24.7 %) of the statements. The three categories t*riage, measures on patient* and *transportation to hospital* hold the lowest amount of scores, together accounting for 31 (1.9 %) of the statements

Table 1

Frequency distribution of statements across the components of the FORSTÅTT framework (N=17)

	FORSTÅTT categories	Frequency	Perc. of total	*M*	*SD*
F	Preparation	408	24.7 %	24.0	9.7
O	Information, deployment, organization/management	140	8.5 %	8.2	5.0
R	Risk assessment, reconnaissance and resources	235	14.2 %	13.8	7.6
S	Securing and situation report	110	6.7 %	6.5	4.7
T	Triage (prioritizing)	20	1.2 %	1.2	2.3
Å	Management of the scene	157	9.5 %	9.2	7.8
T	Measures on patient	6	0.4 %	0.4	0.9
T	Transportation to hospital	5	0.3 %	0.3	0.6
	SUM FORSTÅTT	1081	65.4 %	63.6	24.0
	Residual	571	34.6 %	33.6	10.1
	TOTAL	1652	100 %	97.2	32.1

.

Together, the five core components and the three coordinating mechanisms constitute the Big Five of Teamwork model, and accounted for a total of 1033 statements or 62.5 % of the statements (*M* = 60.8, *SD* = 21.5). A total of 397 statements are accounted for by both the core components and the coordinating mechanisms. A cross tabulation between the five core components and the coordinating mechanisms is presented in Table 2.

Table 2

Cross tabulation of the core components and the coordinating mechanisms of the Big Five of Teamwork model

	Coordinating Mechanisms				
Core Components	Shared mental models	Closed-loop communication	Mutual trust	Residual	TOTAL
Team leadership	137	114	22	146	419
Mutual performance monitoring	2	5	4	5	16
Back-up behavior	13	2	0	11	26
Adaptability	6	4	0	12	22
Team orientation	65	17	6	32	120
Residual	204	184	42	619	1049
TOTAL	427	326	74	825	1652

Separately, the five core components of the Big Five of Teamwork model accounted for 603 statements or 36.5 % of the statements ($M = 35.5$, $SD = 16.9$). The three coordinating mechanisms accounted for 827 statements or 50.1 % of the statements ($M = 48.6$, $SD = 18.8$). The distribution of statements across the five core components is presented in Table 3, and the distribution of statements across the three coordinating mechanisms is presented in Table 4. Table 3 and Table 4 show that three categories of the Big Five of Teamwork model score relatively high. The core component *team leadership* holds 419 (25.4 %) of the statements, the coordinating mechanisms *shared mental models* holds 427 (25.8 %) statements, and *closed-loop communication* account for 327 (19.7 %) of the statements.

Table 3

Frequency distribution of statements across the core components of the Big Five of Teamwork model (N=17)

Big Five of Teamwork Core Components	Frequency	Perc. of total	*M*	*SD*
Team leadership	419	25.4 %	24.6	10.3
Mutual performance monitoring	16	1.0 %	0.9	2.0
Back-up behavior	26	1.6 %	1.5	2.4
Adaptability	22	1.3 %	1.3	2.3
Team orientation	120	7.3 %	7.1	5.1
SUM Core Components	603	36.5 %	35.5	16.9
Residual	1049	63.5 %	61.7	21.2
TOTAL	1652	100 %	97.2	32.1

Table 4

Frequency distribution of statements across the coordinating mechanisms of the Big Five of Teamwork model (N=17)

Big Five Coordinating Mechanisms	Frequency	Perc. of total	*M*	*SD*
Shared mental models	427	25.8 %	25.1	12.0
Closed-loop communication	326	19.7 %	19.2	10.4
Mutual trust	74	4.5 %	4.4	3.0
SUM Coordinating Mechanisms	827	50.1 %	48.6	18.8
Residual	825	49.9 %	48.5	16.0
TOTAL	1652	100 %	97.2	32.1

Together, the FORSTÅTT framework and the Big Five of Teamwork model accounted for a total of 1377 statements or 83.4 % of the statements ($M = 81.0$, $SD = 28.3$). Figure 2 illustrates the relationship between the two. As Figure 2 shows, the FORSTÅTT framework and the Big Five of Teamwork model account for 737 (44.6 %) of the same statements. FORSTÅTT holds 344 (20.8 %) statements alone, while 296 (17.9 %) statements were unique to Big Five of Teamwork. A total of 275 (16.7 %) of the statements were classified as residuals, thus they are not accounted for by neither FORSTÅTT, nor Big Five of Teamwork.
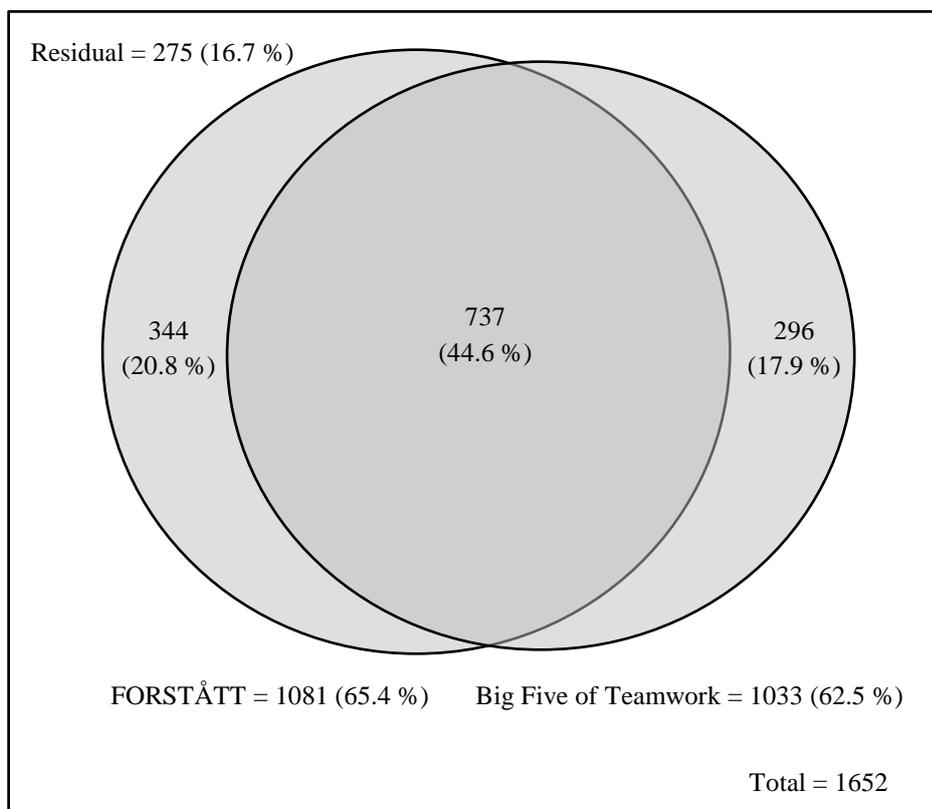
Figure 2. The relationship between statements within the FORSTÅTT framework and the Big Five of Teamwork model. FORSTÅTT = 1081 (65.4 %), Big Five of Teamwork = 1033 (62.5 %), unique contributions of FORSTÅTT = 344 (20.8 %), unique contributions of Big Five of Teamwork = 296 (17.9 %), shared contributions = 736 (44.6 %), combined = 1377 (83.4 %).

Table 5, presented below, displays a cross tabulation of FORSTÅTT and Big Five of Teamwork, and shows which components account for the same statements. It is worth noticing that the component *preparation (F)* of the FORSTÅTT framework holds a large number of statements that are not accounted for by the Big Five of Teamwork model.

Table 5

Cross Tabulation of Big Five of Teamwork and FORSTÅTT

	FORSTÅTT									
Big Five of Teamwork	F	O	R	S	T	Å	T	T	FORSTÅTT Residuals	TOTAL
Team leadership	49	80	98	25	1	75	1	2	88	419
Mutual performance monitoring	2	1	4	2	1	1	0	0	5	16
Back-up behavior	2	0	1	0	0	11	1	0	11	26
Adaptability	0	1	4	7	0	3	0	0	7	22
Team orientation	24	4	27	6	7	6	1	0	45	120
Core Components Residuals	331	54	101	70	11	61	3	3	415	1049
TOTAL	408	140	235	110	20	157	6	5	571	1652
Shared mental models	109	33	102	12	17	54	4	1	95	427
Closed-loop communication	29	57	62	72	0	21	1	1	83	326
Mutual trust	13	1	6	2	0	7	0	0	45	74
Coordinating Mechanisms Residuals	257	49	65	24	3	75	1	3	348	825
TOTAL	408	140	235	110	20	157	6	5	571	1652

Hypothesis Testing

Hypothesis 1 predicted that there would be no significant difference between the total number of statement and the number of statements accounted for by the FORSTÅTT framework. A paired-samples t-test was conducted to compare the total number of statements stated by each participant ($M = 97.18$, $SD = 32.08$) and the number of statements accounted for by the FORSTÅTT framework ($M = 63.59$, $SD = 23.96$). The t-test showed a significant difference; $t(16) = 13.78$, $p<0.001$ ($M = 33.59$, $SD = 10.05$), $d = .96$, $r = .98$. Therefore the hypothesis was rejected.

Hypothesis 2 predicted that there would be no significant difference between the total number of statements and the number of statements accounted for by the Big Five of Teamwork model. A paired-samples t-test was conducted to compare the total number of statements stated by each participant ($M = 97.18$, $SD = 32.08$) and the number of statements accounted for by the Big Five of Teamwork model ($M = 60.76$, $SD = 21.46$). The t-test showed a significant difference; $t(16) = 11.70$, $p<0.001$ ($M = -36.41$, $SD = 12.84$), $d = .95$, $r = .96$. Thus, the hypothesis was rejected.

Hypothesis 3 predicted that there would be no significant difference between the total number of statement and the number of statements accounted for by the combination of the

FORSTÅTT framework and the Big Five of Teamwork model. A paired-samples t-test was conducted to compare the total number of statements stated by each participant (M = 97.18, SD = 32.08) and the number of statements accounted for by in the combination of FORSTÅTT framework and Big Five of Teamwork model (M = 81.00, SD = 28.30). The t-test showed a significant difference; $t(16)$ = 11.72, $p<0.001$ (M = 16.18, SD = 5.69), d = .95, r = .99. Therefore the hypothesis was rejected.

Hypothesis 4 predicted that statements that were not accounted for by either the FORSTÅTT framework or the Big Five of Teamwork model would be statements that are irrelevant to the topic of interdisciplinary team collaboration within the ICP. A total of 275 statements or 16.7 % of statements were coded as residual. A content analysis was conducted and revealed that the residuals did contain statements that were of relevance to the topic. Thus, the hypothesis was rejected.

Residuals

The residuals yield nine new themes, based on their content. In addition, the themes were placed within different context categories. A total of 9 statements or 3.3 % of the residual statements were once again coded as residuals, meaning they were irrelevant to the topic of interdisciplinary team collaboration. The distribution of residual statements into the new themes and across the contexts categories is presented in Table 6.

Table 6

Frequency Distribution of Residual Statements

Context category	Residual themes	Frequency	Perc. of residual
Individual	Personal characteristics	23	8.4 %
	Decision strategies	27	9.8 %
Group	Interpersonal knowledge	29	10.5 %
	Evaluation, and knowledge sharing	27	9.8 %
Organization	Economy and personnel	21	7.6 %
	Organizational structure	52	18.9 %
Work Domain	Societal changes and demands	28	10.2 %
	Logging, justification and criticism	20	7.3 %
	Technical devices	39	14.2 %
	SUM residual categories	266	96.7 %
	Residuals	9	3.3 %
	TOTAL	275	100 %

As Table 6 shows, the nine categories were divided into different contextual levels. Themes placed within the individual category of context deal with statements reflecting matters that are specific to an individual, and that influence behavior. Within the group category, statements concern elements that the participants regard as important to all team members, in order for teamwork to be efficient. The organizational category of context deals with matters regarding overall aspects of the organization that may have implications for the emergency response work. Themes included within the work domain category point out elements that are specific to the emergency response domain, and that may influence the performance of tasks. Together, the four context categories hold nine themes, which are summarized below.

Personal characteristics: The theme contains statements about personal characteristic that influence the emergency response work. These statements revolve around personal work motivation (e.g. interest in and serious about the job, and interest in doing a good job), and personal characteristics and capabilities (e.g. level of stress and ability to keep calm in a chaotic situation, ability to be structured and organized, simultaneous capacity, empathy for others, and communication skills).

Decision making: The themes contain statements concerning how operational commanders resonate individually when making decisions. The statements concern different types of decision making strategies (e.g. ad hoc decisions, intuitive decision making, decisions based on past experience and mental models, or improvisation). In addition, statements address the fact that in an emergency situation with high degree of time pressure, decisions have to be made fast, thus making quality assurance and a 100 % optimal solution difficult.

Interpersonal knowledge: The theme contains statements concerning knowledge of the people one works with, from work related settings and from settings outside of work. The statements refer to knowledge of colleagues' level of work-related skills and experience, awareness of how they react in different situations, and knowledge about how to best communicate with colleagues, interpret what they say, and how to read their body language. In addition, knowledge about other units' resources and organizational structure is expressed as important.

Evaluation and knowledge sharing: The theme contains statements concerning evaluation and knowledge sharing within and between units and districts. These statements include topics such as the importance of evaluating task performance after an incident,

debriefs after challenging events, and what elements that have to be present for evaluation to be useful (e.g. honesty, openness, highlighting of what went well and not so well). In addition, statements within this category concern sharing of knowledge, and continuation with what is already working well.

Economy and personnel: The theme contains statements related to economy and personnel. For the economical aspect, statements include economical strains (e.g. cost savings, prioritizing of economic resources) and how this affects different aspects of the emergency response work (e.g. training, equipment, evaluations). Regarding personnel, statements concern the shortage of personnel, the need for recruitment due to population growth and increasing amount of events, and replacement of personnel due to retirements.

Organizational structure: The theme contains statements concerning organizational aspects of the emergency response service. The statements refer to how the emergency units are structured and organized out in the field as well as in other levels of the organization. Organizational aspects concerning geographical placement are also included in this category. In addition, statements concern how the emergency response service might be organized in other ways than it is today. Statements included in this category also revolve around how the different levels and divisions of the emergency response service are prioritized in the organization.

Societal changes and demands: The theme contains statements about the increasing changes and demands of the society. These statements address that societal changes lead to a growing amount of events, new types of events, and that events are more extreme than they were before. In addition, society demands more from the emergency response units now than it did earlier, in regards to what they should be able to handle, how fast they should respond and when an ambulance is needed.

Logging, justification and criticism: The theme contains statements about the increasing demand for logging and justification of work related actions taking place during an incident, due to criticism and hindsight from individuals or from the media. In addition, statements include the fact that it can be hard to keep track of every action and decision made in the midst of an incident, when things happen fast and when time is limited. Fear of criticism might be a barrier for decision making, taking action, and completion of the work in general.

Technological Devices: The theme contains statements about the status of technological devices in the emergency response work. The statements concern what

technological devices are used today, as well as what devices might be helpful in the future. Nevertheless, some statements also concern the challenges linked to new technology.

Post-Hoc Analysis

After conducting a content analysis of the statements coded as residual in the FORSTÅTT framework and the Big Five of Teamwork model, nine themes were visible, divided across four context categories. Statistical analysis revealed that together, FORSTÅTT, Big Five of Teamwork and the residual categories accounted for 1643 statements or 99.5 % of the statements.

<div align="center">

Discussion

</div>

Summary of Results

The purpose of this study was to investigate how the FORSTÅTT framework and the Big Five of Teamwork model would correspond with what operational commanders regarded as important aspects of interdisciplinary team collaboration within the ICP. Semi-structured interviews were held to collect data, generating a total of 1652 meaningful statements that were coded according to the components of the FORSTÅTT framework and the Big Five of Teamwork model. The descriptive results showed that the FORSTÅTT framework accounted for 65.4 % of the statements, while the Big Five of Teamwork model (core components and coordinating mechanisms) accounted for 62.5 % of the statements. When combining the two frameworks, FORSTÅTT and Big Five of Teamwork together accounted for 83.4 % of the statements. Thus, the combined model accounted for a larger number of the statements than either of the frameworks did separately.

Hypothesis 1 aimed to test whether the FORSTÅTT framework would be able to account for all relevant aspects of interdisciplinary team collaboration within the ICP. Analysis revealed that out of the 1652 statements brought up in the interview, FORSTÅTT accounted for 1081 statements. The distribution of statements shows that all the categories contained statements, as presented in table 1. Still, some categories contained notable large or small numbers of statements. The t-test showed a statistically significant difference between the total number of statements and the statements accounted for by the FORSTÅTT framework, with a large effect size ($d = .96$), according to Cohen (1988). However, the paired-samples correlation was high ($r = .98$). This may have influenced the results in that it

generates a higher probability of getting significant results. Nevertheless, hypothesis 1 was rejected.

Hypothesis 2 aimed to test whether the Big Five of Teamwork model would be able to account for all relevant aspects of interdisciplinary team collaboration within the ICP. Analysis revealed that, the Big Five of Teamwork model accounted for 1033 statements out of the 1652 statements brought up in the interviews. The five core components accounted for 603 statements, while the three coordinating mechanisms accounted for 827 statements. Out of these, 397 statements were accounted for by both the core components and the coordinating mechanisms. The distribution of statements shows that all the categories of the five core components and the coordinating mechanisms contained statements, as presented in table 3 and 4. Still, some categories contained notable large numbers of statements. The t-test showed a statistically significant difference between the total number of statements and the statements accounted for by the Big Five of Teamwork model, with a large effect size ($d = .96$), according to Cohen (1988). However, the paired-samples correlation was high ($r = .98$). This may have influenced the results in that it generates a higher probability of getting significant results. Hypothesis 2 was rejected.

Hypothesis 3 aimed to test whether a combination of the FORSTÅTT framework and the Big Five of Teamwork model would be able to account for all relevant aspects of interdisciplinary team collaboration within the ICP. Analysis revealed that out of the 1652 statements brought up in the interview, the combination of the two frameworks accounted for 1377 statements. This indicates that the combination of the FORSTÅTT framework and the Big Five of Teamwork model accounted for a larger number of statements than either of the frameworks was able to separately. The combination of the two frameworks account for some of the same statements, but also held some separate statements, as presented in Figure 2. The t-test showed a statistically significant difference between the total number of statements and the statements accounted for by the Big Five of Teamwork model, with a large effect size ($d = .96$), according to Cohen (1988). However, the paired-samples correlation was high ($r = .98$). This may have influenced the results in that it generates a higher probability of getting significant results. Hypothesis 3 was however rejected.

Hypothesis 4 aimed to test whether the statements not accounted for by the combined framework were relevant or irrelevant to the topic of interdisciplinary team collaboration within the ICP. The hypothesis followed the rationale behind hypothesis 1, 2 and 3, and predicted that statements that were not accounted for by any of the frameworks would be

irrelevant to the topic of interdisciplinary team collaboration in the ICP. A total of 275 statements were coded as residual in both frameworks. The content analysis revealed that out of the total number of residual statements, 266 statements contained new themes, while 9 statements were irrelevant to the domain of interdisciplinary team collaboration. Due to the high amount of statements relevant to the topic, hypothesis 4 was rejected.

A *Post-hoc analysis* was introduced and designed based on the failure of the previous hypotheses. The content analysis conducted in connection to hypothesis 4 revealed a total of nine new categories important to the domain. Statistical analysis showed that together, FORSTÅTT, Big Five of Teamwork and the residual themes accounted for 1643 statements or 99.5 % of the statements.

Discussion of the FORSTÅTT Framework

FORSTÅTT describes the pattern of actions taking place during an incident in a sequential manner, and emphasizes what tasks should be carried out, by whom, and in what order (Vigerust et al., 2009). The essential thought behind the FORSTÅTT framework is of importance: for the emergency units to effectively and efficiently collaborate they need to have a common understanding of important actions taking place during emergency events, and they need a shared language to ease communication. Still, several aspects of the framework may have implications for its ability to serve as intended. The discussion of the FORSTÅTT framework will revolve the components of the framework, since the components were the basis for this study.

The fact that statements were distributed throughout all the eight components of the framework implies that FORSTÅTT includes important aspects of interdisciplinary team collaboration in the ICP. However, some components stood out by accounting for a large or a small number of statements. *Preparation* which is the F component of FORSTÅTT holds the highest number of statements within the framework's categories. This may be due to the category being broadly defined and containing many elements. The category includes actions taking place before an incident occurs such as preexisting knowledge and experience, in addition to actions taking place when the alarm goes off. Even if the preparation category is broadly defined and contains many elements, the elements within the category are of importance to operational commanders within the ICP. Thus, this may be the reason for the high number of statements within the F component. It might be argued that it could be appropriate to adjust the framework in order to assess which elements within the preparation

component that is of most importance, and to make it easier to remember important aspects within the category. Simplification of important aspects to remember is after all the main point of a SOP.

The three T components of FORSTÅTT *triage*, *measures on patient*, and *transportation to hospital*, hold the least amount of statements. The FORSTÅTT framework is to some degree health-specific, even though the framework claims to be an interdisciplinary SOP. All the T-components of FORSTÅTT refer to aspects of the emergency response work that involve tasks connected to health emergency workers, and concerning actions that are to be made in relation to patients. It may be that FORSTÅTT puts such a high degree of emphasis on the health aspect of emergency response work because the framework has been developed by the Norwegian Air Ambulance. It may also be due to the fact that the number one priority for all emergency response units is to save lives. The health related tasks within emergency response are important aspects to include in an interdisciplinary SOP. Still, it might be argued that the FORSTÅTT framework could benefit from combining the categories triage, measures on patients and transportation to hospital.

It can be discussed how appropriate it is to suggest that the components of the FORSTÅTT framework follow in a sequential manner. The domain of emergency response work is complex, due to the complexity of emergency events themselves and because of the compound composition of people handling such events. Furthermore, a situation might alter, contributing to the incident shifting between phases, and between the actions related to each phase. Sequential models and frameworks are often not suitable for describing complex systems (Rasmussen, 1997). It may therefore be more appropriate to leave the view of the FORSTÅTT framework being a sequential framework. Also, some elements, for example communication and the need for information, may be important during all phases of an incident. When responding to unexpected events, access to real-time information is essential to effectively coordinate the scene (Edmondson, 2003). The FORSTÅTT framework does not seem to account for such ongoing needs. It can be argued that the framework would benefit from highlighting aspects that are relevant throughout all stages of action.

The FORSTÅTT framework is developed to fit the Norwegian emergency response service and is built on the different units' separate SOPs. Nevertheless, the framework is not based on empirical research on the domain of emergency response. This may be due to little empirical research on the domain within a Norwegian context. Other countries may have a different structure of their emergency response service, which might in some cases make it

difficult to apply findings into a Norwegian context. The fact that the FORSTÅTT framework does not originate from research may have implications for its validity.

In summary, some of the FORSTÅTT components contain a large amount of elements and statements, while others contain few. Alterations may be carried out in order to modify the framework, making important aspects of emergency response tasks easier to remember. It may be incorrect to suggest that the components of the FORSTÅTT framework appear in a sequential manner, since sequential models and frameworks are often not appropriate for describing complex environments and systems. In addition, the fact that the FORSTÅTT framework is not based upon research may have implications for its validity. Even though FORSTÅTT is a domain-specific framework, it was not able to account for all important aspects of teamwork within ICP. Some alterations might be made to make the FORSTÅTT framework even more suitable as in interdisciplinary SOP.

Discussion of the Big Five of Teamwork Model

The Big Five of Teamwork model is proposed as a generic model, intended to outline aspects of teamwork that are relevant for all types of teams and teamwork, regardless of tasks or organization (Salas et al., 2005). Since the Big Five of Teamwork model claims to be generic, the model should have been able to account for all aspects of teamwork within the ICP. However, the model failed to do so. This may suggest that the model is not as generic and generalizable as it claims to be, and might not be suitable for the complex domain of emergency response work. The discussion of the Big Five of Teamwork model will highlight the importance of the components that held large numbers of statements, and further on point out one aspect that the model failed to account for.

When comparing the number of statements accounted for by the Big Five of Teamwork model, the core component team leadership and the coordinating mechanisms shared mental models and closed-loop communication stood out by accounting for large amounts of the statements. *Team leadership* has been shown to influence the effectiveness of a team (Salas et al., 2005), and can therefore be said to be an important aspect of teams and teamwork. However, the high amount of statements accounts for by team leadership may be seen in connection to the participants being leaders of their respective units, thus expressing more thoughts in relation to their leader role. *Shared mental models* have in the research literature been proposed as increasingly important for teams working within a complex environment and under stressful conditions (Cannon-Bowers & Salas, 1998; Salas et al.,

2005). The need for a common understanding of the environment and expectations of performance is essential in predicting other team members' needs, coordinating the tam and working toward a common team goal. The high number of statements accounted for by shared mental models may be a result of the importance of the component within the topic of interdisciplinary team collaboration in ICP. *Closed-loop communication* within the ICP is important in order to coordinate an emergency event. Communication has proven to be an essential factor for teams operating under conditions characterized by an environment escalating in complexity (Salas et al., 2005). Also, communication is important when the performance of tasks is closely dependent on the performance of another task. In other words, communication is invaluable for ICP, when a team engage in highly collaborative and cooperative tasks, depending on coordination.

It may be important to note that the majority of statements within the preparation category of the FORSTÅTT framework were not accounted for by the Big Five of Teamwork model, as Table 5 showed. The preparation component contained a large amount of elements, as stated earlier. However, these elements contains a substantial amount of elements concerning actions that happen before the actual teamwork starts are of importance for the interdisciplinary team collaboration within the ICP. It may seem as if the Big Five of Teamwork model does not consider elements of teamwork that have to be in place prior to the actual teamwork process. Still, they may be important aspects of teamwork, and it can be argued that a team cannot perform and accomplish tasks effectively without its team members possessing the knowledge and the resources needed to complete their work.

In summary, the Big Five of Teamwork model did not account for all important aspects of interdisciplinary team collaboration within ICP, even though the model is said to be a generic model. However, several of the Big Five of Teamwork components contain a large amount of elements and statements, implying that they are important to teamwork within the domain. he model was nevertheless not able to account for aspects of teamwork that have to be in present prior to the actual teamwork process. This suggests that the model may not be as generalizable as it is intended to be. Some alterations might be made to make the Big Five of Teamwork model even more suitable for describing important elements of teamwork.

Discussion of Residual Categories

The content analysis was conducted in order to investigate if the statements coded as residuals contained relevant to the domain in question. The results reviled nine themes that

were of importance for interdisciplinary team collaboration within the ICP, and the themes were divided into four context categories. This section of discussion will deliberate on why the context categories and the themes they include are of importance for teamwork and task performance within the ICP.

The two themes *personal characteristics*, and *decision strategies*, were included in the individual context category. They both reflect that individual difference may affect teamwork, and therefore also the emergency response work in general. People differ in behavior, due to personal characteristics. Personal characteristics can influence task accomplishment and job performance, based on for example an individual's ability to handle stress and to be flexible when needed. People also differ in the way they resonate when making decisions. Individual differences in reasoning may be of importance for the decisions being made within the ICP team. Their individual mental models based upon preexisting knowledge and experience, may for example lead to individuals making different assumptions about a situation. Different decision strategies can contribute to wrong decisions being detected and corrected (Politidirektoratet, 2012). The FORSTÅTT framework and the Big Five of Teamwork model are both team related frameworks, and may therefore not account for elements concerning individuals within a team. Individual team members seem to only be considered in relation to the team tasks. Still, people differ from each other and it is important to remember the individual within a team context.

The two themes *interpersonal knowledge*, and *evaluation and knowledge sharing*, were included in the group category of context. They reflect aspects of teamwork that operational commanders regard as important for the entire emergency response service as a team. Interpersonal knowledge contributes to ease communication, and making communication barriers smaller. To know the people one works with is especially important for teams working within a complex work environment (Stout, Salas, & Fowlkes, 1997). Participants expressed that interpersonal knowledge influence how one talks to each other, and how one interprets each other's verbal communication or body language. It can be argued that awareness of other team members' way of being is especially important in a complex environment such as at an emergency response scene, due to differences in how people react in the situation. Interpersonal knowledge and relationships have been found to be important factors of team effectiveness (Ancona & Caldwell, 1988). Evaluation and knowledge sharing were other group process that participants stated as important for teamwork. Having an open conversation and receiving feedback after an emergency incident is essential for developing

new strategies, adjusting coordination methods, and alter communication patterns. Furthermore, it can enhance team performance and effectiveness (Marks, Zaccaro, & Mathieu, 2000). The FORSTÅTT frameworks and the Big Five of Teamwork model were not able to account for the themes interpersonal knowledge or evaluation and knowledge sharing, even though this are elements that concern the entire team. The reason may be that the two frameworks are highly task-driven and only concern aspects of teamwork that are directly related to the actual performance of tasks. However, when a team continues to work together after a goal is reached, interpersonal knowledge, evaluation and knowledge sharing may be of great importance for future task accomplishment.

The two themes within an organizational context are *economy and personnel*, and *organizational structure*. The themes reflect how organizational aspects may influence collaboration within the ICP. Economy and personnel is an ongoing challenge for the emergency response service, and put restrictions on the emergency response work. For instance, it influence the amount of training emergency workers receive, what equipment they have available, in addition to the personnel resources the units have available. Limited economical resources and shortage of personnel contribute to the operational commanders having to participate directly in the emergency response work, thus not being able to coordinate the scene with the other operational commanders. This is especially a problem in the districts. The structure of the emergency response organization was another organizational matter that operational commanders regarded as important for their teamwork. Participants expressed that the districts they operated within were being expanded, contributing to longer traveling distances when an incident occurred, thus longer response time. In addition, it affected their knowledge about colleagues. Several participants from the districts also expressed a wish for a more established work title, and that this could contribute to operational commanders being better mentally prepared for the tasks and responsibility connected to the position. The FORSTÅTT framework and the Big Five of Teamwork model were not able to account for statements concerning issues regarding the organizational aspect affecting the ICP team. It is however important to take into consideration that a team functions within an organization and its context, and that organizational matters may influence performance and collaboration within a team.

Three themes were included in the work domain category, *societal changes and demands*, the theme *logging, justification and criticism*, and finally *technical devices*. They all reflect aspects of the specific work domain that can influence collaboration within the ICP.

Societal changes and demands put the emergency response service under pressure. As society changes, so does the regular types of emergency events, and also the demands from society. Societal changes influences the abilities and capacities emergency workers should possess, while the demands from society stress how fast it is expected that they shall respond to and handle an emergency event. The theme logging, justification and criticism can be seen in connection to the growing demand from society. The emergency response service often receives criticism from the media or private individuals after handling emergency incidents where lives or important values have been lost. The criticism is often based on hindsight, when all relevant information is visible. Participants expressed that this type of criticism might inhabit decision making and task performance at an emergency incident. The fact is that operational commanders only have access to a limited amount of information when an incident occurs. The combination of time pressure and lack of information during an emergency operation leads to the ICP team having to make decisions fast, decisions that might not be 100 % accurate. Knowing that society will criticize decisions made may result in inhabited decision making and action. Several of the participants stated that technological devices would be useful for combating the information problem that exists during an incident. Technological devices could in addition be used for decision support, and for logging actions. It appeared that the emergency response work did not use a lot of technological support devices in their work, and some participants even said that in connection to technical devices, the emergency response units were living "in the stone age". In general, the operational commanders expressed a variety of issues where technology would be useful and how this could enhance performance within the ICP. Nevertheless, some participants also expressed concerns about possible challenges that may rise from the implementation of such devices. Research has shown that technology can help improve team performance, however it is not guaranteed (Edmondson, 2003; Salas et al., 2008). Technological devises must be easy to use if they shall improve performance. The FORSTÅTT framework and the Big Five of Teamwork model were not able to address certain work-specific features of collaboration within the ICP. For the FORSTÅTT framework, it may be that the themes are not considered because they concern aspects of the work that can be done little about, or elements that are not yet a part of the teamwork. The Big Five of Teamwork model might not have been able to account for the themes due to the facts that the model does not consider work-specific aspect of teamwork. It can however be argued that specific aspects of the work can influence teams and collaboration, and thus the performance and accomplishment of tasks.

General Discussion

The results from this study provide a foundation for stating that the FORSTÅTT framework and the Big Five of Teamwork model do not account for all aspects that are important for interdisciplinary team collaboration within the ICP. The following section will discuss how the statements held uniquely by one framework could contribute to developing the other framework further, and how the themes identified in the content analysis can provide additional information about the domain. Further on, implications the results may have for training and evaluation will be presented.

The combination of the FORSTÅTT framework and the Big Five of Teamwork model accounted for a larger number of statements, thus including several of important aspects of interdisciplinary team collaboration in ICP. As presented in Figure 2, FORSTÅTT and Big Five of Teamwork each contain unique contributions and shared contributions regarding the domain. This suggests that separately one framework captures aspects of the topic that the other framework disregards. It may therefore be of interest to consider revising each of the frameworks so that they include aspects that the other framework captures. FORSTÅTT may for instance account for domain-specific aspects of teamwork that the Big Five of Teamwork model is not able to account for. One example is that the FORSTÅTT framework provides a better grasp of the preexisting knowledge that team members have to possess before tasks can be solves, as discussed earlier. Conversely, Big Five of Teamwork might perhaps embrace some general aspects of teamwork better than the FORSTÅTT framework does. For example, the model seems to present the importance of shared mental models and communication in a clearer manner than the FORSTÅTT framework does, highlighting their importance for teamwork.

The results from the content analysis of residual statements showed that several important themes were missed by the FORSTÅTT framework and the Big Five of Teamwork model. This provides an additional foundation for arguing that the two frameworks are not capable to account for all important aspects of teamwork involved in interdisciplinary team collaboration within the ICP. FORSTÅTT and Big Five of Teamwork are both highly task-driven, thus they fail to account for several aspects of the context that the team is working within. The results may suggest that in a complex work environment such as emergency response, elements of teamwork that are not directly related to the performance of tasks during an emergency incident are also of interest. Hence, it may not be sufficient to only consider task related elements of teamwork to fully understand the elements that affect the

functioning of such teams. It may be reasonable to consider whether it would be beneficial to modify the frameworks in connection to its use in interdisciplinary team collaboration within the ICP. The categories identified by the conduction of the residual content analysis may provide additional information to a possible modification of the frameworks. In addition, it can be argued that results from this study can be generalized to other situations with similar ways to cope with similar task demands of other environments (Cannon-Bowers & Salas, 1998).

The complex nature of emergency events has implications for training emergency response teams. It is sometimes difficult to train teams for specific situations that they may encounter, due to the fact that an emergency incident occur unpredictably, often include several uncertain element, and that events are never exactly alike (Marks et al., 2000). Nevertheless, preparing the ICP teams and enabling them to adjust strategies and tactics according to rapid changes in the environment may be one solution for effectively combating the problem of uncertainty of an emergency situation. Hence, it is important to obtain a training situation that reflects the complex work environment of real emergency events. Team and teamwork training may be of great importance for the purpose of enhancing the effectiveness of the emergency response work. Teamwork training can, in addition to providing exercise and experience in task performance, contribute to better interpersonal knowledge within the team. Participants in this study stated this as important factor because knowing the people one works with may ease communication, reduce communication barriers, and make it easier to interpret one's colleagues' verbal and non-verbal messages. Interpersonal knowledge may also produce better shared mental models, and contribute to a better interaction between team members and within the environment. Team and teamwork training can, through the improvement of team communication and shared mental models, be able to enhance the effectiveness of the work (Marks et al., 2000). It is important to note that operational commanders may have specific training needs, even though team and teamwork training is important for all emergency response workers. This is because the main responsibilities of operational commanders' differ from the rest of the emergency response team's work tasks. It may therefore be appropriate to provide specific training opportunities for individual within the ICP, emphasizing its coordinating leader role.

The complexity of emergency events has implications for evaluation of emergency response teams. The variety of factors that influence how the emergency team has performed its tasks during an incident can sometimes be hard to summarize. As noted in the introduction,

the media has a tendency to broadcast their own evaluations of how the emergency response service has performed its tasks. However, the media is often not able to shed light or take into consideration the complexity involved in emergency response work. The image they provide for society may therefore be deceptive. Several of the participants state that they always keep in mind that whatever they do, the media will be there to criticize them. This may occasionally function as a barrier to following the extensive amount of knowledge and experience they possess, hindering them in accomplishing their tasks as efficiently as possible. Nevertheless, the results from this study showed that participants regarded evaluation to be an important aspect of interdisciplinary team collaboration within the ICP. However, when conducting evaluations it is necessary to take into consideration all factors that were present when the emergency work was accomplished, otherwise learning for past experiences can be limited and inadequate. Evaluation is suggested to be of importance, for instance for the development of new strategies, adjustment of coordination methods, and alteration of communication patterns (Marks et al., 2000). The great advantage of good forums for discussion and evaluation was on important factor that several participants raised. In Oslo and a few other places there exist operational commander forums (Operativ Leder Forum, OLF), where operational commanders from the three units meet and share thoughts and experiences. The informants from districts that had not established such a forum clearly stated that this was highly wanted. It may therefore be appropriate to suggest that the emergency response service would benefit from establishing operational commander forums in the districts as well as in the cities. Another advantage of such forums is that operational commanders may get to know each other better, which can have a positive effect on teams and teamwork. It may be of interest for the emergency response service to consider the establishment of discussion forums in all districts. This can contribute to increase the efficiency of the emergency response work, through evaluations, discussions and better knowledge about ones' colleagues.

Limitations of the Study

The use of a mixed model approach with semi-structured interviews and quantification of qualitative data may imply some limitations that can have influenced the results and the interpretation of the results. These will be discussed next.

Sample and sampling: The sample consisted of 17 operational commanders from the three emergency units and with work experience from Oslo and the south-eastern part of

Norway. Even though the interviews generated a substantial amount of valued information and statements, it is important to consider if the number of participants is sufficient and see it in connection to the population. In Oslo, the sample consists of approximately 1/3 of the operational commander population. The calculation of how many operational commanders there are in South-Eastern Norway is harder to asses, due to the fact that it is not an established work title in many districts. The selection of participants was first done through SINTEF and their contact with informant. Further on, selection was mainly done through informants providing contact information to colleagues they thought would be interested in participating in the study. Since the sampling was not done randomly, it is possible that the selection of participants have been biased. A selection bias may result in the sample consisting of participants that are similar to each other, in respect to what aspects of the topic they address, their interest in the topic, and their views in general. Participants were all men, thus the sample may be biased in this regard. However, operational commander is a highly male dominated work title, which might justify the sample only consisting of males. All participants had work experience as an operational commander in Oslo or districts of South-Eastern Norway. This may have implications for the generalizability of the study. Operational commanders from other places may have expressed other views of important aspects of interdisciplinary team collaboration, due to their geographic placement possibly raising other challenges. However, it can be argued that the sample reflects the differences in organization between cities and districts, and that teamwork within the emergency response and in the ICP consists of many similar aspects, regardless of the specific challenges one is faced with. The fact that all participants were operational commanders collaborating with other operational commanders as an interdisciplinary team suggests that the sample should be sufficient and adequate for investigating the frameworks in question.

Interviews: Interviews were conducted by an interviewer, with additional help from an observer. Participants can sometimes be distracted, feel confused or in other ways be biased when there is more than one person asking questions. However, the participants in this study did not seem to be influenced by there being two individuals present at the interview. Each participant was asked two sets of questions, only one related to the present study. The order in which the set of questions were asked may have influenced the talkativeness of the participant. Another factor that may have affected the number of statements made by each participant is at what point of time the interview was conducted. Even though the interviewers had sufficient experience and training in conducting SWOT interviews, it is possible that after

conducting several interviews, the interviewers gained experience in how to get participants to talk more through supplementary questions, and thereby generate a higher amount of information and statements. Another factor that may have influenced is which of the three interviewers that conducted an interview. It may be that the interviewers differed in how much information they were able to gather for an informant. The interview questions were as noted open-ended, provided the participant the opportunity to freely reflect on aspects they thought important for interdisciplinary team collaboration. Some participants expressed a wish for more specific questions. It may therefore be that the interview questions were too broad and general.

Transcriptions: The interviews were recorded and transcribed word by word into text. A few audio recordings included disturbing background noise, such as construction work or alarms and messages on their radio communication systems. This made it to some degree difficult to transcribe the interviews involved, and some words got lost. In addition, some participants mumbled in parts of the interview, which also led to the loss of words in the transcriptions. All transcriptions were checked by going to the audio recordings one extra time, and correcting potential errors. It is therefore likely to assume that the transcriptions where to some degree correctly transcribed.

Unitizing: The analysis of this study is based on units or statements extracted from the interviews through the process of unitizing. Unitizing implicates separating the transcribed interviews into statements, thus it involves the researchers subjective judgment of what does and does not constitute a statement. Accomplishing both reliability and semantic meaningful statements at once may often be difficult (Krippendorff, 2004). Therefore the findings in the study have to be seen in connection with the operationalization of what defines a statement. It is possible that other researchers would have operationalized and judged a statement in a different way. For example, a syntactic definition of a unit or statement (e.g. a sentence or a paragraph) may have been used. Still, using a syntactic definition could affect the validity of the findings by interrupting the meaning in the text. Inter-judge reliability analysis on the unitizing was conducted and showed a moderate reliability of 68 %. To ensure a higher degree of reliability, the individuals involved in the unitizing might have gone through the operationalization of the units more thoroughly. However, this was not done because of limited time.

Coding: The coding was conducted, based on the operationalization of the categories of the frameworks. Misinterpretation of the content concerning the categories of the

frameworks would affect how statements are coded. The framework categories were operationalized and defined based on definitions in the original articles. In regards to the FORSTÅTT framework, some of its components overlapped and included elements that were also important in other categories. An example of this was communication that appeared to be an element in several of the frameworks components. This contributed to the coding process and the fitting of a statement into a category being sometimes difficult and might have led to statements being wrongfully placed in a category. In this study the phases of the FORSTÅTT framework were not coded. It is possible that other results may have been generated if the phases were included as a part of the framework and in the coding process. When it comes to the Big Five of Teamwork model, the model's components appear to be thoroughly explained, including both definitions and behavioral makers. Still, there is always a possibility of misconceptions regarding their meaning and content. The statements were coded separately into both the core components and the coordinating mechanisms of the model. This was done because while both the core components and the coordinating mechanisms constitute the Big Five of Teamwork model, the coordinating mechanisms function as facilitators of the core components in tying their values together. Other researcher might have chosen to code the core components and the coordinating mechanisms together, which might have generated other results. In general, coding involves extensive work and concentration, and there is always a possibility in human errors occurring during the coding process. Therefore, there is always a possibility that some statements have been coded into a category wrongfully, or the possibility of statements fitting into a category having been coded as residual. Due to time limitations, inter-coder rate was not calculated.

Content analysis: A content analysis was conducted to investigate if statements coded as residuals were relevant or irrelevant to the topic of interdisciplinary team collaboration in ICP. The low number of statements that remained residuals after the content analysis was conducted may have been a result of statements that were clearly irrelevant to the topic being excluded from the analysis when unitizing was conducted. Statements were carefully categorized according to their content. However, the process of conducting a content analysis is highly influenced by the researcher. It is therefore possible that other researchers would have classified residuals in another manner and thereby generated other results. Still, it is likely to suggest that the categories outline a basic structure of the content of statements first coded as residuals, while it may be possible to separate statements within a category even further.

Future Research

　　There exists an extensive amount of research regarding the topic of teams and teamwork. Still, more research is needed in the context of interdisciplinary team collaboration within the emergency response service and the ICP. The present study may function as a starting point for future studies and research. The following provides a few suggestions as for where to start.

　　Based on results presented in this study, it would be possible to investigate and elaborate further on both the FORSTÅTT framework and the Big Five of Teamwork model. The relevance of the components within each of the frameworks could for example be closer investigated. In addition, research can be done to determine the relevance of the categories identified in the content analysis. This may provide a deeper insight in important aspects of teams, teamwork, and within the domain of emergency response work.

　　Future studies may also take a closer look at how teams actually function. It could for example be interesting to investigate how the SWOT elements are distributed in connection to the components of the frameworks. Such research can provide an understanding of elements of the presence that are working well and not so well, and possible improvements and challenges in regards to the future.

　　Also, a comparison between groups within the emergency response service can be a possible direction for further research on the domain. Here, a suggestion would be to include a larger sample, in terms of the number of participants, position within the emergency response service, and geographic placement. This might shed light on needs that might exist for different groups, at a local or national level. It could also be beneficial to take a closer look at emergency response work at an international level.

　　The study may serve as a foundation for further investigation and research on teams and teamwork within other complex sociotechnical systems. Nevertheless, it is critical to thoroughly examine and have an understanding of a domain, before conducting research. The need for more research on the collaboration within the ICP and other divisions of the emergency response service is needed, in order to ensure development within the domain.

<div align="center">

Conclusion

</div>

　　This study shows that the domain-specific FORSTÅTT framework and the generic Big Five of Teamwork model both include elements that are important to interdisciplinary team collaboration within the ICP. Still, neither of the frameworks was able to account for the

majority of statements expressed be operational commanders regarding the topic. A combination of the two frameworks was able to account for a larger number of the statement than either of the frameworks did separately. The statements not accounted for by either of the frameworks revealed several themes that were relevant to interdisciplinary team collaboration in ICP. These results show that the FORSTÅTT framework and the Big Five of Teamwork model both failed to account for all important aspects if interdisciplinary team collaboration within the ICP. The results provide an understanding of the work-domain as a complex sociotechnical system, and that several aspects of teamwork are of importance for the effectiveness of task performance. More research is needed to ensure development within the field.

References

Ancona, D. G., & Caldwell, D. F. (1988). Beyond Task and Maintenance. *Group & Organization Management, 13*(4), 468-494. doi: 10.1177/105960118801300405

Arslan, O., & Er, I. D. (2008). SWOT Analysis for Safer Carriage of Bulk Liquid Chemicals in Tankers. *Journal of Hazardous Materials, 154*(1–3), 901-913. doi: 10.1016/j.jhazmat.2007.10.113

Baker, D., Georgakopoulos, D., Schuster, H., Cassandra, A., & Cichocki, A. (1999). *Providing customized process and situation awareness in the collaboration management infrastructure.* Paper presented at the Cooperative Information Systems, 1999. CoopIS '99. Proceedings. 1999 IFCIS International Conference on.

Bang, H. (2008). Effektivitet i lederteam - hva er det, og hvilke faktorer påvirker det? *Tidsskrift for Norsk Psykologforening, 45*, 272-286.

Beaubien, J. M., & Baker, D. P. (2004). The use of simulation for training teamwork skills in health care: how low can you go? *Quality and Safety in Health Care, 13*(1), 51-56. doi: 10.1136/qshc.2004.009845

BRIDGE (2012). BRIDGE webpage, from http://www.bridgeproject.eu/en. Read September 14th, 2011.

Cannon-Bowers, J. A., & Salas, E. (1998). Team Performance and Training in Complex Environments: Recent Findings from Applied Research. *Current Directions in Psychological Science, 7*(3), 83-87.

Cannon-Bowers, J. A., Tannenbaum, S. I., Salas, E., & Volpe, C. E. (1995). Defining competencies and establishing team training requirements. In R. A. Guzzo& E. Salas (Eds.), *Teams: Team effectiveness and decision making in organizations* (pp. 333-380). San Francisco: Jossey-Bass.

Chermack, T. J., & Kasshanna, B. K. (2007). The Use and Misuse of SWOT Analysis and Implications for HRD Professionals. *Human Resource Development International, 10*(4), 383-399. doi: 10.1080/13678860701718760

Clark, C., & Milne, R. (2001). *National Evaluation of the PEACE Investigative Interviewing Course*. Home Office.

Cohen, J. (1988). *Statistical Power Analysis for the Behavioral Sciences* (2nd ed.). Hillsdale, NJ: Erlbaum.

Comfort, L., & Kapucu, N. (2006). Inter-organizational coordination in extreme events: The World Trade Center attacks, September 11, 2001. *Natural Hazards, 39*(2), 309-327. doi: 10.1007/s11069-006-0030-x

Dougherty, D. (1992). Interpretive Barriers to Successful Product Innovation in Large Firms. *Organization Science, 3*(2), 179-202. doi: 10.1287/orsc.3.2.179

Edmondson, A. C. (2003). Speaking Up in the Operating Room: How Team Leaders Promote Learning in Interdisciplinary Action Teams. *Journal of Management Studies, 40*(6), 1419-1452. doi: 10.1111/1467-6486.00386

Field, A. (2005). *Discovering Statistics Using SPSS* (2nd ed.): Sage Publications.

Flin, R., Winter, J., Sarac, C., & Raduma, M. (2009). *Human Factors in Patient Safety: Review of Topics and Tools*. World Health Organization.

Gonzalez, R. A. (2008, 7-10 Jan. 2008). *Coordination and Its ICT support in Crisis Response: Confronting the Information-Processing View of Coordination with a Case Study.* Paper presented at the Hawaii International Conference on System Sciences, Proceedings of the 41st Annual.

Hackman, J. R. (1987). The Designe of Work Teams. In J. Lorsch (Ed.), *Handbook of Organizational Behavior* (pp. 315-342). New York: Prentice Hall.

Hoff, T., Flakke, E., Larsen, A-K., Lone, J. A., Bjørkli, C. A., & Bjørklund, R. A. (2009). On the Validity of M-SWOT for Innovation Climate Development. *Scandinavian Journal of Organizational Psychology, 1*.

Johnson, R. B., & Onwuegbuzie, A. J. (2004). Mixed Methods Research: A Research Paradigm Whose Time Has Come. *Educational Researcher, 33*(7), 14-23. doi: 10.3102/0013189X033007014

JRCC (2012). Joint Rescue Coordination Center webpage, from http://www.hovedredningssentralen.no. Read March 26th, 2012.

Kay, J., Maisonneuve, N., Yacef, K., & Reimann, P. (2006). *The Big Five and Visualisations of Team Work Activity*. University of Sydney Technical Report 581.

Kozlowski, S. W. J., & Klein, K. J. (2000). A multilevel approach to theory and research in organizations: Contextual, temporal, and emergent processes. In K. J. Klein & S. W. J. Kozlowski (Eds.), *Multilevel theory, research, and methods in organizations: Foundations, extensions, and new directions.* (pp. 3-90): San Francisco, CA, US: Jossey-Bass.

Krippendorff, K. (2004). *Content Analysis: An Introduction to Its Methodology* (2nd ed.). Thousand Oaks, California: Sage Publications.

Lichtenstein, R., Alexander, J. A., Jinnett, K., & Ullman, E. (1997). Embedded Intergroup Relations in Interdisciplinary Teams. *The Journal of Applied Behavioral Science, 33*(4), 413-434. doi: 10.1177/0021886397334001

Lovdata. (1995). Lov om politiet (politiloven), from http://www.lovdata.no/all/hl-19950804-053.html. Read August 20th, 2011.

Lovdata. (2000). Lov om helsemessig og sosial beredskap (helseberedskapsloven), from http://www.lovdata.no/all/hl-20000623-056.html. Read August 20th, 2011.

Lovdata. (2002). Lov om vern mot brann, eksplosjon og ulykker med farlig stoff og om brannvesenets redningsoppgaver (brann- og eksplosjonsvernloven), from http://www.lovdata.no/all/nl-20020614-020.html. Read August 20th, 2011.

Lund, T. (2011). Combining Qualitative and Quantitative Approaches: Some Arguments for Mixed Methods Research. *Scandinavian Journal of Educational Research, 56*(2), 155-165. doi: 10.1080/00313831.2011.568674

Malone, T. W., & Crowston, K. (1990). *What is coordination theory and how can it help design cooperative work systems?* Paper presented at the Proceedings of the 1990 ACM conference on Computer-supported cooperative work, Los Angeles, California, United States.

Marks, M. A., Zaccaro, S. J., & Mathieu, J. E. (2000). Performance implications of leader briefings and team-interaction training for team adaptation to novel environments. *Journal of Applied Psychology, 85*(6), 971-986. doi: 10.1037/0021-9010.85.6.971

Mendonça, D., Jefferson, T., & Harrald, J. (2007). Collaborative adhocracies and mix-and-match technologies in emergency management. *Communications of the ACM, 50*(3), 44-49. doi: 10.1145/1226736.1226764

Minestry of Justice and Public Security (1999). *Den norsk redningstjeneste*. PDC Tangen.

Minestry of Justice and Public Security (2008) *Håndbok for Redningstjeneten*. Høringsutgave.

MOM (2007) *Medisins Operativ Manual* (6 ed., pp. 1-152).

NOU 2000:24 (2000). *Et sårbart samfunn*. Oslo: Statens forvaltningstjeneste, Informasjonsforvaltningen.

PBS 1 (2011). *PBS 1 - Politiets Beredskapssystem Del 1, Rettningslinjer for politiets beredskap*. Norway: Politidirektoratet.

Perneger, T. V. (1998). What's wrong with Bonferroni adjustments. *British Medical Cournal, 316*, 1236-1238.

Perrow, C. (1999). *Normal Accidents: Living with High-Risk Technologies*. NJ, USA: Prinston University Press.

Politidirektoratet (2012). 22.juli 2011, Evaluering av politiets innsats. Norway: Politidirektoratet.

Rake, E. L. (2008). *Chrises Management. Coping and decision making on-scene.* Ph.D, University of Stavanger.

Rake, E. L., & Njåå, O. (2009). Perceptions and performances of experienced incident commanders. *Journal of Risk Research, 12*(5), 665-685. doi: 10.1080/13669870802604281

Rasmussen, J. (1997). Risk management in a dynamic society: a modelling problem. *Safety Science, 27*(2–3), 183-213. doi: 10.1016/s0925-7535(97)00052-0

Salas, E., Burke, C. S., & Cannon-Bowers, J. A. (2000). Teamwork: emerging principles. *International Journal of Management Reviews, 2*(4), 339-356. doi: 10.1111/1468-2370.00046

Salas, E., Cooke, N. J., & Rosen, M. A. (2008). On Teams, Teamwork, and Team Performance: Discoveries and Developments. *Human Factors: The Journal of the Human Factors and Ergonomics Society, 50*(3), 540-547. doi: 10.1518/001872008x288457

Salas, E., Dickinson, T. L., Converse, S. A., & Tannenbaum, S. I. (1992). Toward an understanding of team performance and training. In R. W. Swezey & E. Salas (Eds.), *Teams: Their training and performance* (pp. 3-29). Norwood, NJ: Ablex.

Salas, E., Sims, D. E., & Burke, C. S. (2005). Is there a "Big Five" in Teamwork? *Small Group Research, 36*(5), 555-599. doi: 10.1177/1046496405277134

Solvic, P., & Weber, E. U. (2002). *Perception of Risk Posed by Extreme Events*. Paper presented at the Risk Management strategies in an Uncertain World, Palisades, New York.

Statkonsult (2003). Evaluering av myndighetenes krisekommunikasjon i forbindelse med Åsta-ulykken. Statkonsult: Norway.

Stout, R. J., Salas, E., & Fowlkes, J. E. (1997). Enhancing teamwork in complex environments through team training. *Group Dynamics: Theory, Research, and Practice, 1*(2), 169-182. doi: 10.1037/1089-2699.1.2.169

The Ministry of Petrolium and Energy & Norwegian Petrolium Directorate. (2012). *Facts 2012 The Norwegian Petrolium Sector*. Eds: J. Ø. Hansen & B. Rasen.

Vestad, A.-L. (2010). *Teamwork and Safety in the Maritime Industry: A SWOT Approach.* Master Thesis, University of Oslo.

Vigerust, T. (2012,). E-mail correspondence April 9th, 2012.

Vigerust, T., Andersen, J. E., & Vollebæk, L.-E. (2009). FORSTÅTT. *Ambulanseforum, 4*, 25-29.

Weber, R. P. (1990). *Basic content analysis*: Sage Publications.

Weick, K. E. (1993). The Collapse of Sensemaking in Organizations: The Mann Gulch Disaster. *Administrative Science Quarterly, 38*(4), 628-652.

Weick, K. E., & Roberts, K. H. (1993). Collective Mind in Organizations: Heedful Interrelating on Flight Decks. *Administrative Science Quarterly, 38*(3), 357-381.

Zarghooni, S. (2011). *Applying Models for Safety Climate on Rail Traffic Management.* Master Thesis, University of Oslo.

Interview Guide

Informasjon før intervjuet, kort intro om:
- Masteroppgaven: tre masteroppgaver om samhandling, kommunikasjon og beslutninger. Skriver for SINTEF som leder BRIDGE-prosjektet.
- BRIDGE: prosjekt som har som mål å utvikle metoder og teknologi for å bedre samarbeidet på tvers av etater og land under større krisesituasjoner.
- Samtykkeskjema
- SWOT
- Nåtid/fremtid

Jeg vil først høre litt som samhandlingen i ILKO slik den er pr. i dag:
- Hvilke styrker ser du ved måten du samhandler i ILKO?

Jeg er fortsatt interessert i dagens samhandling, men ønsker nå å høre litt om:
- Hvilke svakheter ser du ved måten du samhandler i ILKO?

Med tanke på dagens praksis så ønsker jeg nå å se litt fremover i tid:
- Hva kan på sikt kan være utfordringer ved samhandlingen i ILKO?

Fortsatt med tanke på fremtiden:
- Hvilke muligheter ser du for at samhandlingen i ILKO kan bli mer effektiv i fremtiden?

Forsterkere:
- Hva mener du?
- Hva da?
- Kan du utdype det?
- Kan du fortelle litt mer om……?
- Har du et eksempel på det?
- Du nevnte……, kan du si noe mer om det?
- Under svakheter nevnte du…… Hvordan kan dette eventuelt løses i fremtiden?
- Du har allerede nevnt noen styrker/svakheter/positive/negative sider ved……, hvilke andre S/W/O/T gjelder her?

Appendix B

Information Letter

Takk for at du har vist interesse for å delta i dette forskningsprosjektet. Vi er tre masterstudenter innen Arbeids- og Organisasjonspsykologi ved Universitetet i Oslo som skriver oppgave for SINTEF, som leder BRIDGE prosjektet. I forbindelse med våre masteroppgaver ønsker vi å intervjue operative ledere fra helse, innsatsledere fra politi og fagledere fra brann, som har erfaringer fra en eller flere større krisehendelser.

BRIDGE-prosjektet: BRIDGE er et EU-finansiert prosjekt som har som mål å øke sikkerhet gjennom å utvikle tekniske og organisatoriske løsninger, for å forbedre håndtering av kriser og katastrofer. Fokuset ligger blant annet på samarbeid på tvers av etater og landegrenser ved store krisehendelser som terroranslag, naturkatastrofer og industriulykker. Prosjektet skal medføre økt sikkerhet og trygghet for befolkningen i Europa gjennom fler-faglig nødetatskoordinering og ledelse ved storskala akutthendelser. For mer informasjon om BRIDGE-prosjektet, se http://www.bridgeproject.eu/.

Mål med forskningen: Vi vil fokusere på ILKO bestående av operative ledere fra de tre blålysetatene, og se på koordinering, kommunikasjon, informasjonsbehov og beslutningsprosesser. Formålet er å teste vitenskapelige modeller, prosedyrer og «best practice» i krisesituasjoner.

Hvordan du kan forberede deg: Vi er interessert i *dine* personlige meninger og erfaringer når vi intervjuer deg, ikke andres tanker. Vi ber deg forberede deg på følgende spørsmål:

Hvilke styrker ser du ved måten du tar beslutninger i ILKO i dag?
Hvilke svakheter ser du ved måten du tar beslutninger i ILKO i dag?
Hva kan på sikt være utfordringer knyttet til beslutninger du tar i ILKO?
Hvilke muligheter ser du for at du kan ta bedre beslutninger i ILKO i fremtiden?

Hvilke styrker ser du ved måten du samhandler i ILKO?
Hvilke svakheter ser du ved måten du samhandler i ILKO?
Hva kan på sikt kan være utfordringer ved samhandlingen i ILKO?
Hvilke muligheter ser du for at samhandlingen i ILKO kan bli mer effektiv i fremtiden?

Deltakelse: Intervjuet vil foregå på norsk. Vi vil være to stykker tilstede ved intervjuet, der en intervjuer, og den andre observerer og kommer med eventuelle oppfølgingsspørsmål. Vi regner med at intervjuet vil ta ca. 1,5 til 2 timer, inkludert pause.

Håndtering av datamaterialet og konfidensialitet: I henhold til etiske retningslinjer for forskning er din deltakelse i studiet frivillig. Du kan når som helst trekke deg fra intervjuet og studiet uten å oppgi noen grunn. Intervjuet vil bli tatt opp på bånd, og deretter transkribert. Deler vil også oversettes til engelsk. Dette vil gjøre det lettere for oss å analysere data i ettertid og sikre korrekt gjengivelse av det du sier. Informasjonen du oppgir kan også være av interesse for Bridge forskere fra andre land, kun forskere i Bridge vil få tilgang til datamaterialet. Transkripsjonene vil beholdes i anonymisert form for bruk videre i BRIDGE-prosjektet. Lydfilene vil bli sletter senest ved prosjektslutt 2014.

Unitizing Procedure

Mål med unitizing: Målet med unitizing er å isolere meninger fra hverandre. Meningsfulle ytringer må forstås i seg selv. Vi må forme kortest mulige enheter med deler av eksempel/spørsmål for å klargjøre poenget.

Definisjon meningsfylt ytring: Så korte utsagn som mulig, men fortsatt meningsfulle.
The best content analyses define their context units as large as is meaningful (adding to their validity) and as small as is feasible (adding to their reliability) (Krippendorff, 2004)

1. **Et avgrenset og meningsfylt utsagn (statement)**
   Hvordan vi vurderer avgrensning av meningsfylte utsagn

- Vi ser det som et nytt utsagn ved tematisk brudd.
   - Et poeng/mening = et nytt tema, nye aktører, nye sider ved saken.
   - Vi deler i to statements der hvor det er mulig å dele uten å miste mening.
   - Vi må vurdere statements i forhold til bottom up og top down (SWOT og andre rammeverk) hvis i tvil. Så lite som mulig føringer fra top-down.

2. **En nyansert beskrivelse av et overordnet tema**
   Ved store, generelle temaer lager vi også mindre statements av undertemaer.

- En mening som gjentas og nyanseres må unitizes som en egen enhet. Eksempler er:
   - Store/generelle temaer: kommunikasjon
   - Mindre statements: ikke verbal kommunikasjon, ansikt til ansikt kommunikasjon, dialog, radio etc.
   - KUN når det nevnes flere underkategorier, da skilles det til flere enheter. Også hvis det skilles med «og» i en setning. Hvis ikke er det del av eksempelet («i forhold til» uten «og», «fordi», «det vil si», «som gjør at».)

3. **Eksemplifiseringer som bærer mening i og for seg.**
   Hvordan vi vurderer eksempler som meningsfylte utsagn.

- Et eksempel som har et poeng men som ikke uttales/konkretiseres markeres i blått for å senere vurdere/konkretisere i SPSS.

4. **Eksemplifiseringer som forbereder eller følger opp et statement:**

- Alle eksemplifiseringer som understøtter/forløper eksempel statementer.
   - Følger opp/understøtter: Poeng tatt opp i neste setning, derfor kategorisert som eksempel.

- Forbereder/forløper: Poeng tatt opp i setninger før, men konkretisert i senere statement.
- Eventuelt legg til deler av eksempelet i klammer for å tydeliggjøre statement.

5. **Premisser for et kommende eller allerede uttalt poeng/ytring**
   Bakgrunnsinformasjon/kontekst, premisser som understøtter et poeng.

- Eksempel: «Vi har nødnett.»
  - Hvordan det påvirker samhandling/beslutning blir gjerne utdypet, og DET blir en statement.
  - Inkludere premissen i utsagnet for å gjøre det mer forståelig.

Gjennomføring av unitizing

- Hele teksten skal fargekodes i enheter, men unntak av det intervjuer sier.
- Lese gjennom en gang og skille enheter fra hverandre, deretter lese gjennom en gang til for å få helheten og sile ut eventuelle «ekstra-statements»
- Legge til informasjon fra spørsmål/eksempler i setninger rundt i klammer for å klargjøre meningsfulle ytringer.
- Hvis det refereres til «det/den/dette» o.l., må det eksemplifisere med klamme. For eksempel ved svar på spørsmål må det refereres til deler avl spørsmålet stilt.

Operationalization and Coding Manual for FORSTÅTT

Components of the FORSTÅTT model, based on Vigerust et al. (2009)

1. *F = Preparation (Forberedelse)*
   Be prepared for all types of events. Use existing professional knowledge and experience, including education and training. Consider necessary equipment and resources. Take weather conditions and environment into account. Consider safety issues. Make plans and strategies for further performance through established standard operational procedures. Establish contact with other leaders in CP.

2. *O = Information, deployment, organization/management (Opplysninger, oppmarsj og organisering/ledelse)*
   Gather and provide information and details on the way to the incident. Think big and request sufficient resources. Communicate with the dispatch center. Follow a deployment plan, including appropriate placement of vehicles and resources, and ensure an escape route. Establish CP and other management functions. Communicate clearly in the initial phase of the operation.

3. *R = Risk assessment, reconnaissance and resources (Risikovurdering, rekognosering og ressurser)*
   Risk and safety assessment for oneself, others (personnel and patients), environment, and assets. Obtain an overview of the situation. Reconnaissance together with the operational commanders and other possible leaders in CP to understand each other's needs and not lose contact. Proactive resource assessment (acquire enough resources for the present and for the future). Alert other emergency units and stakeholders (e.g. Red Cross, Coast Guard, land owners) and consider their response time.

4. *S = Securing and situation report (Sikring og situasjonsforståelse)*
   Ensure the safety of oneself and personnel. Secure against present and future threats. Consider future aspects and be pro-active, not reactive and incident driven. Provide and obtain situation report to the dispatch centers. Give and receive good, accurate and time-critical information. Adjustment of resources if needed.

5. *T = Triage (prioritizing) (Triage (prioritering))*
   Prioritizing of patients so everybody gets the right treatment to the right time. Prioritizing of life first, then environment and assets. Provide appropriate treatment, in the right order, at the right time.

6. *Å = Management of the scene (Åstedshåndtering)*
   Continue with the operative work at the incident. Good overview over the situation. Clear roles and responsibilities. Communication, coordination and control. Handle the media.

7. *T = Measures on patient (Tiltak på pasient)*
   Life-saving measures are the main priority for all agencies. After the triage, give physical and psychological first aid to all who are involved.

8. _T = Transportation to hospital (Transport til sykehus)_
Start the transportation of patients with critical conditions to the hospital as soon as possible. Contact with medical dispatch center regarding transportation of patients. Establish collaboration between the patient assembly area and the evacuation control point.

9. FORSTÅTT residual
Statements that do not fit into any of the FORSTÅTT components.

Operationalization and Coding Manual for Big Five in Teamwork

Core components, based on Salas et al. (2005)

1. Team leadership
   Definition: Ability to direct and coordinate activities of other team members, assess team performance, assign tasks, develop team knowledge, skills and abilities, motivate team members, plan and organize, and establish a positive atmosphere.

   Behavioral markers: Facilitate team problem solving. Provide performance expectancies, and acceptable interaction patterns. Synchronize and combine individual team member contributions. Seek and evaluate information that affect team functioning, clarify team member roles. Engage in preparatory meetings and feedback sessions with the team.

2. Mutual performance monitoring
   Definition: The ability to develop common understandings of the team environment and apply appropriate task strategies to accurately monitor teammate performance,

   Behavioral markers: Identifying mistakes and lapses in other team members' actions. Providing feedback regarding team member actions to facilitate self-correction.

3. Back-up behavior
   Definition: Ability to anticipate the other team members needs through accurate knowledge about their responsibilities. This includes the ability to shift workload among members to achieve balance during high periods to workload or pressure.

   Behavioral markers: Recognition to potential backup providers that there is a workload distribution problem in their team. Shifting of work responsibilities to underutilized team members. Completion of the whole task or parts of tasks by other team members.

4. Adaptability
   Definition: Ability to adjust strategies based on information gathered from the environment through the use of back-up behavior and reallocation of intra team resources. Altering a course of action or team repertoire in response to a changing condition.

   Behavioral markers: Identify cues that a change has occurred, assign meaning to that change, and develop a new plan to deal with the changes. Identify opportunities for improvement and innovations for habitual or routine practices. Remain vigilant to changes in the internal and external environment.

5. Team orientation
   Definition: Propensity to take others behavior into account during group interaction and the belief in the importance of team goal's over individual members goals.

Behavioral markers: Taking into account alternative solutions provided by teammates and appraising that input to determine what is most correct. Increased task involvement, information sharing, strategizing, and participatory goal setting.

6. Core component residual
Statements that do not fit into any of the core components of the Big Five in Teamwork model.

Coordinating Mechanisms, based on Salas et al. (2005)

1. Shared mental models
Definition: An organizing knowledge structure of the relationships among the tasks the team is engaged in and how team members will interact.

Behavioral markers: Anticipating and predicting each other's needs. Identify changes in the team, task or teammates and implicitly adjusting strategies as needed.

2. Closed-loop communication
Definition: The exchange of information between a sender and a receiver irrespective of the medium.

Behavioral markers: Following up with team members to ensure message was received. Acknowledging that the message was received. Clarify with the sender of the message that the message was received is the same as the intended message.

3. Mutual trust
Definition: The shared belief that team members will perform their roles and protect the interests of their teammates.

Behavioral markers: Information sharing. Willingness to admit mistakes and accept feedback.

4. Coordinating mechanisms residual
Definition: Statements that do not fit into any of the coordinating mechanisms of the Big Five in Teamwork model.

Appendix F

Informed Consent Form

Ved å signere dette skjema bekrefter du at du har mottatt informasjon om prosedyrene og detaljer rundt prosjektet, at du har fått tilstrekkelig mulighet til å vurdere denne informasjonen, og at du frivillig vil delta i prosjektet. Du vil motta en kopi av dette samtykkeskjema.

Jeg bekrefter at jeg har lest og forstått "Informasjonsskriv november 2011" for ☐
Bridge prosjektet.

Jeg har hatt muligheten til å vurdere denne informasjonen, og fått tilfredsstillende ☐
svar på spørsmål vedrørende forskningen.

Jeg sier meg villig til å delta i intervjuet og forstår at min deltakelse er frivillig. ☐

Jeg forstår at jeg når som helst kan trekke meg som deltaker, uten å matte oppgi ☐
noen grunn.

Jeg er innforstått med at informasjonen jeg gir vil bli behandlet konfidensielt av alle ☐
forskerne.

Jeg tillater at mine svar blir tatt opp på lydbånd. ☐

Jeg forstår at all data som samles inn vil bli behandlet anonymt, med pseudonym. ☐

Jeg tillater at dere referer til meg som «Operativ leder» ☐

Jeg forstår at jeg kan få tilsendt kopier av resultatene av studiet. ☐

NAVN (vennligst bruk blokkbokstaver):

_____

ADDRESSE:

_____

_____

SIGNATUR til deltaker: _____

DATO OG STED: _____