Virtual Emergency Operation Centre: How to Manage a Crisis from an EOC when you need to work from home

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**ABSTRACT**

What happens when an organization requires its employees to work from home during a pandemic that needs to be managed? This research in progress article focuses on TELCO_ALPHA and the transition of their emergency operation centre (EOC) to digital and distributed. A qualitative research method approach was applied and liminality has been used as lens to investigate the shift from analog to digital. Focus has been on understanding the transition and how they handled ambiguity within the organization when their crisis management moved online. The transition was successful, and two areas were identified as important to this success: 1. TELCO_ALPHA used IT that the staff in the crisis organization already had experience of working with prior to the Covid-19 pandemic; 2. TELCO_ALPHA ran crisis management team meetings as they would run regular business meetings. There was no new “crisis management structure” at the meetings.

**Keywords**

Crisis management, EOC, liminality, transition.

**INTRODUCTION**

During the Covid-19 pandemic, old work structures were put aside and new distributed work structures were introduced. In this article, we depart from one of many effects that Covid-19 has had on society, namely physical distancing and encouraging working from home.

When an extraordinary event occurs, the crisis organization is triggered, and in many situations the special organization is located in some type of Emergency Operation Center (EOC). In the EOCs, the work is focused on both managing the upcoming situation and finding strategic and tactical ways out of the crisis. In municipalities, private companies and at police authorities, the EOC staff entering the EOC is moving from one work assignment or responsibility that they carried out before the crisis, to another work assignment or responsibility that they carried out before the crisis, to another work assignment or responsibility in the EOC (see e.g. Bergsten & Gustafsson, 2005; Erik. Borglund, 2017; E. A. M. Borglund, 2020; Johansson, Danielsson, & Borglund, 2012; Svensson, 2007). Most often the EOC is what is best described as a temporal organization (Lundin & Söderholm, 1995) and the temporal organization exists side by side with the permanent organization but with different tasks. In the EOC there are several important tasks, but Landgren and Bergstrand (2016) present findings from an ethnographical study describing the huge collaborative work taking place in the EOC as intertwined with technology usage. Five key activities were identified: “Assembling, monitoring, exploring, converging, and consolidating” (Landgren & Bergstrand, 2016, p. 4). In some organizations, e.g. the police, the activities taking place in the EOC are familiar to the staff that will be assigned to the EOC, but for some organizations the staff has rarely worked in an EOC, e.g. a municipality (Granholm, 2019; Myndigheten för samhällsskydd och beredskap, 2014, 2017). To be prepared for the work in the EOC, staff members actively participate in emergency training exercises (Asproth, Borglund, & Öberg, 2013; Svensson, 2007).

During the Covid-19 pandemic, at the request of public authorities in Sweden, people that could should work from home. At TELCO_ALPHA, an international telephone company, the head of the company decided that all...
employees should work from home, except for the most important technicians. This was also the case for the security department, a group that regularly works in EOCs during crises. In this case, the security department needed to deal with both the pandemic and the effect it had on the company, as well as be prepared for any other emergency that might threaten the company and their business. From one day to the next, TELCO_ALPHA adjusted their crisis management approach from working in a well-equipped physical EOC during a crisis, to only working from home and still fulfilling their crisis management responsibilities in a virtual EOC, with the same social structures included as in the physical EOC.

This paper is research in progress, where the first 7 months of pandemic work at TELCO_ALPHA is in focus. The aim is to understand how TELCO_ALPHA has managed their transition from EOC work practice in a physical EOC, to the work practice in a virtual/distributed EOC, i.e. the adaption process of going virtual.

The remainder of this paper consists of a brief presentation of EOC, followed by the research method and the theoretical lens applied in this paper. Finally, the result is presented, followed by an analysis and conclusion of the work.

EOC AND RELATED RESEARCH

“The EOC concept allows for interpersonal communication, technically supported information exchange, and decision-making among the representatives of different agencies” (Kendra & Wachtendorf, 2003, p. 39). Quarantelli (1978) argued that an EOC can be considered both a social system and a place. However, the concept of EOC in the literature is closely linked to a physical location in the form of a room or a similar. EOCs can be formalised in different ways (Perry, 1995), often related to the complexity of the incident and the impact on the community. The EOCs are differently equipped (Perry, 1995); some organisations have well-equipped, permanent places designated for EOC activities, while other organisations configure the place at the time of emergency (Perry, 1995). EOCs are “designed to coordinate activities of actors working toward common goals” (Landgren & Bergstrand, 2016, s. 158). Quarantelli (1978) found that EOCs are highly important during crisis management – they are the centre of activity necessary to manage crisis events. The EOC functions as a hub for communication throughout the event. They are known to have six key functions: co-ordination, policy-making, operations, information gathering, public information and hosting visitors (Perry, 1995, 2003; Quarantelli, 1978). Among these functions, co-ordination has historically been viewed as the central function (Perry, 1995).

In the rather normative descriptions from the Swedish Civil Contingencies Agency (MSB) on how to organize and manage crises from local to national level, it is clear that the organization and EOC is physical (see e.g. Myndigheten för samhällsskydd och beredskap, 2014, 2017). During the large forest fire in Sweden 2014, the organization of a temporal EOC at a small nearby hotel was carried out as planned by the County Administrative Board of Västmanland (Skogsbrandsutredningen, 2015). This means that the EOC can either be set up in a temporal location, or be pre-designed and equipped at a physical location. According to Granholm (2019), staff in an EOC can more easily understand what kind of tasks they are expected to carry out in an EOC through the design and technology found in the EOC.

Prior to 2011, the New York City Office of Emergency Management had its EOC in World Trade Center 7 (7WTC). Due to the terror attack, 7WTC was set on fire and eventually collapsed, forcing the EOC to evacuate and move to another location. Three days later, they had relocated into a semi-permanent location that in many aspects mirrored the original EOC location. (Kendra & Wachtendorf, 2003) Quarantelli (1997) notes that “At one level, the place—particularly the physical facilities—is of relative importance. As a minimum, adequate communication provision, computers, sufficient work space and certain resources, such as maps and equipment inventories, are required. However, the physical facilities in themselves cannot make up for social factors”. That is, extraordinary high-tech equipment is irrelevant, because without people who know how to use the technology and what to do in the heat of the moment, the EOC as a physical place would be useless.

The concept of a virtual EOC can be found in the literature, for example: In the virtual Emergency Operation Center (vEOC) developed in the project Ensayo (Becerra-Fernandez et al., 2008), they did not develop an EOC for operational use. The vEOC of Ensayo focused on developing a virtual EOC, which looked like a real-life EOC, but on a screen or in a system – to achieve this, VR technologies were used. The vEOC of Ensayo was designed to be an important tool for “Design and Development of a Virtual Emergency Operations Center for Disaster Management Research, Training, and Discovery”, “Design and Development of a Virtual Emergency Operations Center for Disaster Management Research, Training, and Discovery”, and “Design and Development of a Virtual Emergency Operations Center for Disaster Management Research, Training, and Discovery” (Becerra-Fernandez et al., 2008, p. 3). Wright and Madey (2008) argued that the vEOC is an important product to complement EOC simulations and similar. They also emphasized that the underlying architecture of the vEOC should be fully open source.
Even if examples of virtual/distributed EOCs are difficult to find, there are tools that aim to support distributed work during crisis like for example Collabbit, which is a web-based software to support collaboration during crisis focusing on information sharing (Lanerolle et al., 2010).

**RESEARCH METHOD**

This research is based on a qualitative research approach (Creswell, 2013; Myers & Avison, 2002) and a combination of data collection methods has been applied. Part of the research has had an ethnographic approach (Van Maanen, 1988), but is better described as self-ethnography (Alvesson, 2003).

The data collection from TELECO_ALPHA has been carried out by three researchers with different approaches, and the research has been iterative throughout the Covid-19 pandemic. Two of the researchers have been outsiders, i.e. they have not worked at TELECO_ALPHA, but they have carried out extensive research within EOC work and crisis management. One of the researchers was an insider, i.e. working at TELECO_ALPHA; this researcher collected data as an ethnographer on an everyday basis. During the data collection of this research (7 months), the insider collected data through short interviews and internal documents. On a regular basis, the two “outsiders” interviewed the “insider”, which was done iteratively, and was more of a continuous analysis of the data collected. The interviews resulted in questions that the insider needed to find answers to at TELECO_ALPHA. That is to say, the insider used an ethnographical approach to collect data, which was then iteratively analyzed by the outsiders. As a complement, interviews with representatives of TELECO_ALPHA have been carried out. The interviews were unstructured which is more common in ethnographical studies. Data was collected from the day the corona pandemic caused the TELCO_ALPHA employees to be required to work from home. This paper represents the first 7 months of work, and is therefore preliminary findings.

**Applied Analytical Lens**

In this article, we aim to understand the process of TELECO_ALPHA organizing into a virtual EOC and adapting to the new situation. We are using liminality as tool in the analysis process. According to Söderlund and Borg (2018), there is an increasing interest in understanding the in-between phases and ambiguity that comes with temporal organizations and temporal work. The concept of liminality (Thomassen, 2018) has gained increased popularity as a way to understand e.g. the passage from one organization form to another (Söderlund & Borg, 2018). When a crisis occurs and selected employees in e.g. the police or in a municipality leave their regular job to join the crisis organization in an EOC, we argue that liminality can be used to understand the ambiguity these employees can feel in such situations, as well the ambiguity for the entire organization, as it also needs to manage regular work as well as the crisis. Liminality is about “rites of passage” between states. The organization’s transition from one (state) position/assignment prior to the crisis to the (state) position/assignment during the crisis in the EOC, can be seen and understood as a passage between states. In this article, we aim to understand the ambiguity TELECO_ALPHA as an organization experienced when entering into a crisis management mode and organizing into a fully vEOC. We are interested in understanding how TELCO_ALPHA tackled the resulting challenges and how the organization dealt with the in-between phase of its ambiguity.

**What About Liminality?**

Arnold van Gennep wrote the book “Les rites de passage” (later translated into English) in 1909 (Gennep, 1960), where he introduced the concept of liminality. Van Gennep (Gennep, 1960) used the concept to understand and present what happens during the rituals in the passage between two states. Today liminality is widely used in organizational studies (Söderlund & Borg, 2018; Tempest & Starkey, 2004). According to Thomassen (2018), Van Gennep’s (Gennep, 1960) concept liminality has its origin in the Latin *limen* that could be translated as *threshold*. Van Gennep (Gennep, 1960) described the passage over the threshold through several ritual phases. He argued that rites of passages could be divided into stages: “rites of separation”, “transition rites”, and “rites of incorporation” (Gennep, 1960, p. 11). He further argued that theoretically one could describe the rites of passages as “preliminal rites (rites of separation) liminal rites (rites of transition), and postliminal rites (rites of incorporation)”. Each rite is not always as present or important.

According to Söderlund and Borg (2018), the use of liminality as concept has greatly increased in recent years. In their review (Söderlund & Borg, 2018) of how liminality has been used, three separate themes are found: Theme 1: Liminality as process, when individuals or an organization carry out the passage. Theme 2: Liminality as position, when individuals and organization are on the “threshold” they manage this position. Theme 3: Liminality as place, where the ritual of passage is a spatial form of passage. Liminality is often used to further elaborate and understand the “betwixt-and-between”; Garsten (1999) presents an example focusing on temporary workers and
their passage. Betwixt-and-between can be seen as the between of moving from one state to another, a neither-this-nor-that state. In this case, the between is the moving from being a physical EOC to being a virtual EOC. Liminality has also been used in studies on learning on both individual and organizational level (Tempest & Starkey, 2004), where liminality was both negative and positive through new positive learning outcomes. Söderlund and Borg (2018) argue that these liminal occasions, when an individual or organization are betwixt-and-between, are moments that trigger reflexivity and learning. This is the primary reason that liminality has been used as lens as the staff of TELCO_ALPHA moved from a live EOC to a vEOC. The passage between is about a transition.

RESULTS
To understand TELCO_ALPHA’s in-between journey it is important to understand how the company organized their crisis management prior to the Covid-19 pandemic.

TELCO_ALPHA Pre Covid-19
Before the pandemic outbreak, TELCO_ALPHA had a rather trimmed and well-working crisis organization. The company had two physical EOCs where the crisis organization met and worked. The two EOCs were connected through a link. During each crisis, some employees joined the meeting in the EOC remotely. The common operational pictures (Erik Borglund, Landgren, & Lintzen, 2014; Myndigheten för samhällsskydd och beredskap, 2014) were always created in the EOC using information that was gathered at TELCO_ALPHA. One shortcoming that several in the crisis management staff at TELCO_ALPHA addressed was that when you joined a crisis management meeting from the outside, i.e. remotely, it was difficult to take an active part in the work in the EOC. The staff on location in the two EOCs focused on their work tasks to create the common operational picture, and remotely connected staff was rarely involved. If you were not in the EOC in person, it was difficult to be part of the work.

Prior to Covid-19, TELCO_ALPHA had extensively trained crisis and incidents within their domain related to various cyber security threats.

TELCO_ALPHA COVID-19
In March, the Public Health Agency of Sweden recommended that all employees in private and public organizations work from home instead of going to the office, if possible. The Swedish CEO at TELCO_ALPHA decided that all except a few employees should carry out their work from home. In January 2020, TELCO_ALPHA implemented Office365 for the entire company.

Initial Phase
When the Public Health Agency of Sweden declared that there was an uncontrolled spread of Covid-19 in Stockholm, TELCO_ALPHA initiated their Crisis Management Team (CMT). The CMT consists of representatives from the business management and the security division. The Covid-19 situation was then managed by an Incident Team – the Incident Team can organize into several task groups, depending on what the situation needs. By separating the CMT from the Incident Teams, TELCO_ALPHA was prepared to manage multiple ongoing crises. Each task force takes responsibility for a certain area. TELCO_ALPHA organized into the following task forces: Risk, Network, IT, Business, Consumer, and Challenge. There was one task group for each division in TELCO_ALPHA. The Incident Team reported directly to the CMT, and the Incident Team consisted of representatives from each task force. This organization did not differ from traditional crises or incidents at TELCO_ALPHA.

The meetings were initially organized by using an internal video-system using the VPN connection. This solution was problematic as the entire company shared the same VPN connection, which turned out to be too limited, and shortly this solution was abandoned for MS Teams.

Second Phase
After one or two days of capacity problems caused by using the internal video system, TELCO_ALPHA switched to MS Teams, which solved the issue. The entire staff was used to the MS Teams environment, which they had been using since January. In MS Teams they could reach and use different standard document templates for the minutes, as well as for other tasks. The CMT meetings were organized in the same way as traditional business meetings instead of being organized as special “crisis meetings”. From day one, TELCO_ALPHA required all
employees in the meeting to have their camera turned on, whether they used the telephone, tablet or the laptop. TELCO_ALPHA used MS Teams as intended, i.e. as a conference software, where chat and voice together with screen sharing was the way of communication.

One interesting reflection is that the CMT did not transform and initiate “crisis mode” in their meetings, which was common in previous crises. Crisis mode is when each member of the EOC receives a pre-defined role¹ and work in the EOC greatly focuses on establishing and documenting what will be a common operational picture on whiteboards in the EOC. By entering a room specially designed to manage crises and severe situations, the room itself also puts the staff into a “mode”. When TELCO_ALPHA used MS Teams to organize a virtual EOC, it rather resembled a business meeting setup. Each member in the meeting behaved more as in a regular business meeting, where it is natural to follow a structured meeting agenda. Each meeting was documented following standardized minutes for meetings, which also meant that the Common Operational Picture was always documented. Nothing was added to the walls because the meeting was fully virtual.

The positive effects TELCO_ALPHA quickly discovered were:
- More effective meetings
- Everyone was more alert
- The COP was shared in Teams using standardized TELCO_ALPHA document templates, available for everyone with access
- You could participate in the meetings from various platforms
- The routines were the same for these meetings as for regular business meetings
- The security levels were the same as during normal business operations

ANALYSIS AND DISCUSSION

Prior Covid-19, TELCO_ALPHA managed crises from a well-known physical EOC. This location worked as a tool in the liminal process to transition from one activity, their everyday work, into the new activity that is crisis management. Granholm (2019) argues that the way a room is organized and equipped supports the staff’s understanding of what actions are to be carried out in the room. TELCO_ALPHA had extensive training in crisis management from their two EOC locations. This training reinforces what tasks have to be carried out and how the room and its equipment can be used to support these tasks. Training also reinforces rules and conventions of crisis management. TELCO_ALPHA relied on rehearsed patterns, roles and routines to assemble and work within the CMT. These routines, rules and conventions also contributed to their transition from one activity to another.

When the decision to carry out work from home was issued by their CEO, a new situation was presented. The CMT was “betwixt and between” striving toward creating an environment for crisis management without the physical location. During this transition they had to define what they were doing in the physical EOC in order to move these activities to a virtual EOC. They turned to tools previously used and relied on routines created for management in the physical location. One example was the use of the internal video system. However, it quickly became obvious that the tools and structure used at the physical location were not suitable for crisis management in a vEOC. In the liminal space they reviewed what resources they had at hand in their virtual room provided by their organization. This way they defined the new reality, juxtaposting it with their way of organizing their EOC work at the physical location. Defining actions performed and crafted the new reality to comprise these actions afforded by the materiality available in their virtual room.

TELCO_ALPHA started to look for other tools and create a structure that in turn would help them create the new vEOC. Since they had to solve the situation quickly, they turned to tools already used in the organization. Even though MS Teams was relatively new in the organization, all members of the CMT had used it for a couple of months. Once again, the room, now digital, and the conventions used in this room guided the way of working. The vEOC meetings were formalized as standard business meetings. That is, formalized as the kind of meetings the staff were used to when using MS Teams, including the structured agenda and routine of documenting the meetings. Using these familiar tools lowered the threshold when transitioning from the physical EOC to the vEOC. Turoff (2002) argues that technology used in action is dependent on daily use. The result of this study extends this statement to also include conventions and routines. It is not only about using the technology, it is about working in familiar ways regardless of whether or not there is a crisis. It includes what to do and how to do it.

¹ At TELCO_ALPHA there are the following mandatory roles: incident manager, recovery manager, log manager, and some or all of the following roles: business decision manager, continuity manager, communication manager, business impact analysis manager, supplier impact.
also the case for the security level. The organization used the same security level as for normal business meetings. However, there was one adjustment: the requirement to use the camera when participating in the CMT meetings. This made it possible to confirm the presence of the participants in the meeting. This created an environment that was familiar to the staff even if the agenda now consisted of Covid-19 and its consequences.

When working in the physical EOC, the walls were used to visualize information. In the vEOC this was not possible, since the staff participated from home with computers or smartphones. During the liminal space the staff thought of this specific action. They asked themselves questions such as: What information is visualized? How do we use this information? What do we have instead of walls? How can we share this information? Instead of the walls used in the physical EOC, the organization turned to well-implemented routines. Templates formulated day-to-day routines and ways of organizing and naming documents were put to use in the vEOC. By using standardized templates and routines to document the meetings, the COP was always documented, up to date and available for anyone with access. MS Teams made it possible to share documents with information that was up for discussion in the vEOC and thereby imitate the discussion previously carried out in front of the walls with information. This way they connected existing resources in a new way to fit into the vEOC practice. Since online netiquette, e.g. taking turns to talk, was implemented, each CMT member took part of all information. In addition, the issue of not being able to fully participate when remotely joining the physical EOC was no longer an issue. This created an environment that made all CMT members alert and involved in the work. Each CMT member was constantly updated on the COP and the decisions made. Weick (1993) describes the importance of each member of a group keeping risks, goals and actions in mind when working in crisis situations. The way TELCO_ALPHA organized their vEOC also created a foundation that made it possible for all CMT members to be aware of risks, goals and actions.

Seven months into the pandemic, TELCO_ALPHA had not identified any severe negative outcomes during the transition from working in EOCs to working in virtual EOCs. The period of ambiguity in the in-between was short; there were two main reasons for this: the CMT managed their meetings in a familiar way, i.e. in the same way as business meetings at TELCO_ALPHA, and; TELCO_ALPHA used a familiar technology, MS Teams, and familiar document templates for documentation. The structure and the technology used created an environment making the period of the liminal phase as short as possible, and the transition became rather unproblematic for TELCO_ALPHA. As described by Gennep (1960), rituals are important in the passage, as well as to support individuals in the new phase, and minimize the time of uncertainty. According to Söderlund and Borg (2018), rituals have been addressed in the literature as important for the transition between phases. At TELCO_ALPHA, the business meeting can be seen as a ritual, following a predefined structure. By relying on well-known rituals, the transition to a virtual EOC was rather smooth. The business meeting ritual had a similar structure and phases regardless of whether the meeting was online or face to face. We therefore argue that rituals in both phases can be useful for a smoother passage between phases.

CONCLUSIONS AND OUTLINES FOR COMING RESEARCH

In this article, the aim was to investigate and study how TELCO_ALPHA, an international telephone company, managed the transition from a classical crisis management approach with physical meetings in an EOC to a fully virtual crisis management creating a virtual EOC. This transition took place over just a few days, and the lens used to investigate this transition was liminality (Gennep, 1960). This in progress research has found that TELCO_ALPHA carried out the transition from physical crisis management to virtual without any problems or challenges. The expected ambiguity and uncertainty during this passage between physical to virtual was not detected at organizational level. The success factors identified were that TELCO_ALPHA managed to minimize the new and unfamiliar during the transition. Two important decisions by TELCO_ALPHA helping to minimize uncertainty can be found: 1. The digital, distributed crisis management organization used information technology that all staff involved was used to. MS Teams was introduced at TELCO ALPHA in early 2020, making the technology familiar, including the O365 package as a whole; 2. During meetings in the virtual EOC held by the Crisis Management Team, they followed a business meeting structure and not a “crisis management mode structure”. A natural continuation of this research is to further investigate whether the findings at organizational level are applicable on individual level amongst the staff at TELCO ALPHA. Whether the staff also managed the transition smoothly will be the forthcoming focus of this research. A given long-term aim of this research is to investigate to what extent physical and virtual environments, organizational structures and IT-systems can minimize the liminal phase that occurs during a crisis when organizations make changes to their organization to manage the developing situation.
REFERENCES


