Reflection in Teams for Training of Prehospital Command and Control Teams

Peter Berggren
Region Östergötland
peter.berggren@regionostergotland.se

Mateo Herrera Velasquez
Linköping University
mathe530@student.liu.se

Jenny Pettersson
Region Östergötland
jenny.pettersson@regionostergotland.se

Oscar Henning
Region Östergötland
Oscar.Henning@regionostergotland.se

Henrik Lidberg
Region Östergötland
Henrik.Lidberg@regionostergotland.se

Björn JE Johansson
Linköping University
bjorn.j.johansson@liu.se

ABSTRACT

Prehospital command and control (PS) is a structure for handling medical accidents in Sweden. It includes terminology, command structure, roles, and performance indicators. The concept is taught and trained at the Centre for Teaching and Research in Disaster Medicine and Traumatology (KMC). The concept is trained using a mixture of lectures, simulation based exercises, and scenario designed by the participants. The scenarios are ran in Emergo Train System (ETS), a versatile and flexible table-top simulation platform, where medical command and control can be trained and evaluated. The purpose of this study was to develop structure for feedback and reflection by using a measure of shared understanding. The empirical study presents how the Shared Priorities instrument can be used to provide structured feedback for training. The paper is concluded with a discussion on how the empirical findings can be integrated in training prehospital medical command and control.

Keywords

Emergo Train System, training, pre-hospital, medical command and control, emergency response

INTRODUCTION

If the emergency response organisation is unclear in case of an accident, suffering and unnecessary mortality may occur. In the 1990ies two accidents took place in Sweden that made this distressingly clear. Those were the Estonia accident in 1994 (Socialstyrelsen, 1997) and a fire in a discotheque in Gothenburg in 1998 (Riddez & Dellgar, 2005). Both accidents included many deaths and injured patients. The national evaluation of these accidents called for a novel approach to handling medical accidents and response. In 2003 the National Board of Health and Welfare (Socialstyrelsen) gave the task of implementing the suggested solution to the Centre for Teaching and Research in Disaster Medicine and Traumatology (KMC) that since then have developed and administered a concept called Prehospital command and control (PS; a Swedish acronym for *Prehospital sjukvårdsledning*). PS is a concept for a national model including a shared terminology, command structure, roles, and defined states of preparedness (cf. https://www.psconcept.se/om-ps; Rüter, Nilsson, & Vikström, 2006). The C2 model is a clarification of the healthcare system's responsibility on a regional level (the county council in Sweden). The concept is based on SOSFS 2005:13, the Swedish national regulations for handling disaster medicine preparedness, and is since 2014 replaced with SOSFS 2013:22. Today there are more than 8000 users trained in the PS concept. The PS concept is a framework for conducting medical command and control. The first ambulance to arrive at the incident scene will be the one to establish medical command and

control, where the persons assume the roles of Ambulance Incident Commander and Medical Incident Commander (Rüter, Nilsson, & Vikström, 2006). However, to maintain the capacity for prehospital medical command and control new operators need to be trained. An important part of the training is the feedback and reflection that the course participants

An important aspect of the medical command and control team is having the knowledge of how to effectively resolve the situation. As many disaster-related deaths are preventable (Cropper & Sahin, 2009), providing a structured approach ensures that unnecessary measures and erroneous interactions are avoided, hence avoiding avoidable deaths and complications. Emergency preparedness is a way to reduce the physical and psychological consequences of an incident. Prehospital command and control is therefore an important part of the medical teams' working structure as the right treatment can reduce future complications, avoid unnecessary suffering, and in the most severe cases avoid possible death. Prehospital medical command and control is the first step regarding health care and thus very important to include in order to assure the best possible outcome (Nilsson & Kristiansson, 2015).

Purpose

In this work in progress paper the aim is to describe the testing of a novel approach for providing feedback and reflection as a part of a training course for prehospital medical command and control personnel using a simulation called *Emergo Train Systems* (see below). This is done by assessing a team's shared understanding and using the team members' perceptions as input for reflection regarding the pros and cons of the Emergo Train Systems PS training conducted at the Centre for Teaching and Research in Disaster Medicine and Traumatology. Shared understanding is assessed using an instrument called *Shared Priorities.* The research question posed in this study is:

Does the outcome from the Shared Priorities Instrument provide a sound basis for feedback and reflection among teams being trained to lead and organize the handling of an accident scene? Consequently, can Shared Priorities be a useful tool for the instructors to promote reflection?

THEORETICAL BACKGROUND

Prehospital medical command and control

Organizational learning (Crossan, Lane, White, & White, 1999; Pilemalm, Andersson, & Mojir, 2014; Drupsteen & Guldenmund, 2014; Lick, 2006) and collective learning (Decuyper, Dochy, & Van den Bossche, 2010; Dochy, Gijbels, Raes, & Kyndt, 2014) are theoretical frameworks for training and learning. This frames how training is achieved and also how training is transferred to performance in the real world. The frameworks also provide guidance on how reflection and feedback can be used to increase learning and transfer (Gabelica, Van den Bossche, De Maeyer, Segers, & Gijselaers, 2014; Drupsteen & Guldenmund, 2014). The PS concept is such a training framework. It is used today in Sweden by all but one county council, which is implementing the concept and will be fully using it from 2019.

The prehospital command and control training program is divided into three parts: PS, PS plus, and PS refresh. PS is an introductory course covering the basics ensuring that the participants have a solid foundation when acting in the prehospital command and control role. PS plus is the advanced course for acting in situations with higher demands. PS refresh is a rehearsal course. The courses are structured as team training and have similarities to the effect based approach to training (EBAT; Fowlkes, Dwyer, Oser, & Salas, 1998). The courses include lectures and workshop elements where the participants execute prehospital command and control in table-top scenarios. All course components are supervised by PS instructors who use the behaviors and experiences from the scenarios to have a dialogue with participants so that they can reflect upon their development.

As response in medical emergencies needs to be quick and appropriately executed, performance indicators have been central to the PS concept. These indicators include timely responses and correct use of terminology, reporting, and behaviors (Rüter & Vikström, 2009; Wakasugi, Nilsson, Hornwall, Vikström, & Rüter, 2009; Rüter, Örtenwall, & Vikström, 2007). After having attended a course in prehospital command and control a participant should be able to establish medical command and control at the scene of the incident, report according to standards, collaborate with other agencies, direct and coordinate the medical operation according to recognized goals, decide on medical orientation in relation to triage, organize transport to hospital, handle information sharing for the medical operation, and assure documentation.

The Emergo Train System

The Emergo Train Systems (ETS) is a Simulation based training approach for improving PS command and control skills. ETS is used for training medical teams, both prehospital and in-hospital, and for collaborative exercises with Police and Fire departments. ETS has been developed, is administered, and owned by Region Östergötland (the County Council of Östergötland) (Nilsson, 2013; Rybing, Nilsson, Jonson, & Bång, 2016; Rådestad et al., 2012; Nilsson et al., 2013; Nilsson et al., 2010).

ETS consists of a paper-based patient database along with resources specific for disaster management. The patients in the ETS belong to an injury category that requires a certain treatment within a specific timeframe. If the caregiver fails to treat the patient in time, he or she might have an unwanted outcome, such as risk for preventable death and complications. The performance indicators from ETS, such as the outcomes of the patient and what treatment they were given (Nilsson et al., 2013; Rüter, Nilsson, & Vikström, 2006) are assessed regularly and are used for evaluation of the participants performance. The goal in a training session is to simulate the whole process, beginning at the accident site unto getting to the hospital, and also the intrahosptial logistics. Throughout the scenario, the patient is supposed to get the correct treatment while keeping recourses in mind (Rybing et al., 2016).

In order to conduct a scenario using ETS, whiteboards are used to represent the accident/incident and hospitals. Magnetic symbols represent patients (see Figure 1), personnel (see Figure 2), and other resources. There are several pre-designed sets: Basic set, Hospital set, Burn set, Decontamination at Hospital set, Psychosocial set etc. The instructors who manage the scenario are responsible for the whole process, from set-up to the after-action review. For a course, several scenarios are used to train different aspects within the same domain. Complexity and difficulty is easy to alter between scenarios.

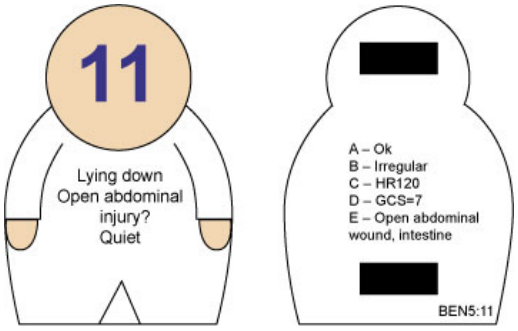

Figure 1. ETS patient. Copyright Emergo Train System.

Figure 2. Example of actors in ETS. Copyright Emergo Train System.

Reflection as a means for learning

Using the items from the Shared Priorities can be used for the teams to reflect upon their shared understanding. According to Daudelin (1996), reflection is a way to step back from an experience and through this eventually learn for future events, to have a guide line in similar events. This process is spontaneous and can occur without any personal awareness. Others (Järvinen & Poikela, 2001; Knipfer, Kump, Wessel, & Cress, 2013) have argued that reflection is the most important aspect of individual, team and organizational learning as it can lead to a better understanding of how one might act, and can act as guideline for future behavior.

Shared Priorities

Maynard and Gilson (2014) explain that shared mental models are positively associated with team performance because they enable team members to build complementary schemas that allow team members to make predictions and understand situations. Shared understanding has been shown to affect team performance (Berggren, 2016). In order to effectively communicate, cooperate, and coordinate, a team needs to maintain a shared understanding of shared goals (Rosen, Fiore, Salas, Letsky, & Warner, 2008). This can be assessed with the Shared Priorities instrument (Berggren, 2016; Berggren, Johansson, & Baroutsi, 2017). This instrument was developed by Berggren (2016) to assess a team's shared strategic understanding. The first step in the method begins with every member of a team writing a list of five items that are important for the team to succeed. These items are then prioritized from 1 to 5, 1 being the most important and 5 being the least important. In the second step one list is chosen randomly and the task for the team members is to prioritize the chosen list in the same way as during the first step. When the two steps are completed, the shared understanding in a team can be computed. In addition, the items and the order of the items on the lists can be used for discussion so that the teams' perception of goals in the situation becomes transparent. The Shared Priorities instrument has been used to provide additional information for instructors during training in both nuclear power plant teams (Berggren, Johansson, & Ekström, 2016) and when training interprofessional teams (Berggren, Johansson, Allard, & Torensjö, 2016).

METHOD

The research question points the method towards a qualitative approach. This data collection was conducted during three different course occasions, namely PS, PS plus, and PS refresh. The organization of the courses was two days of lectures combined with workshops in the ETS environment. At the later part of simulation training the teams had become comfortable and achieved a higher skill level in acting in the prehospital medical command and control roles. At this point the teams responded to the Shared priorities instrument.

The data collection can thus be seen as focusing on teams with different levels of experience in prehospital medical command and control. It should be noted that the scenarios differed between courses and occasions. However, the scenarios were there to expose the participants to situations where they could learn, not to test their ability to resolve the situations. Instead, the study focus on how reflection can be supported by using the Shared Priorities instrument as a mean for providing feedback to the participants in the PS training.

Participants

There were 53 course participants, 31 men and 22 women. PS, PS plus, and PS refresh were represented with 4 teams from each course. All participants were trained nurses, some with a further specialization. The average work experience was 12,7 years. All participants worked in teams with 4 or 5 members during training sessions. The teams used the Shared priorities measure for assessing the teams' shared understanding as feedback to instructors and participants. For some of the teams the generated factors from the Shared priorities measure were used as input for feedback and reflection during the post scenario discussion.

The five instructors who worked in this study were experienced PS instructors (80% had more than 5 years of experience as teachers of PS). Four of the instructors were men. Three of the instructors participated in the interviews.

All participants, both course participants and instructors were informed about the study and signed an informed consent form.

Material

A background questionnaire, the Shared Priorities instrument (Berggren, 2016), and questions to promote learning through discussion of the shared priorities items were used to evaluate the approach. The questions

were:

- Is it the correct factors that are on the lists?
- Is there any list that is more aligned with reality?
- Why are certain factors important for the situation?
- What does **a chosen subject from the lists** mean for your teamwork?

Also, there was an interview protocol for interviews with the instructors.

Procedure

The teams got to practice different scenarios using ETS. Each scenario lasted approximated 30 minutes. After a scenario was finished a Shared Priorities sheet was handed out and the participants responded to step 1. The instructor then randomly chose one of the participants' Shared Priorities sheet for the other participants to rank. In doing this the participants finished step 2. The process with SP took approximately 5 minutes to complete.

Interviews with instructors were conducted after each session. The interviews took approximately 10 minutes each. The questions asked were:

- How is feedback structured today?
- Is it different in between the courses? (PS/PS-refresh/PS-Plus)
- You have now been presented Shared Priorities during the scenarios. Do you think it can contribute to learning? If yes, how?
- Does Shared Priorities contribute to reflection that increases learning?
- Can Shared Priorities support you as an instructor? How?
- Is Shared Priorities more appropriate for some courses/parts?
- Do you see any disadvantages with Shared Priorities? For either the participants or the instructors?
- Would you consider using Shared Priorities as a tool in the courses?
- Something you want to add?

RESULTS

The use of Shared Priorities for reflection

At the PS refresh course the participants were given time to reflect upon the Shared Priorities items. This was done for every team. Four questions were asked and a summary of these questions is presented below:

1. Is it the correct factors that are on the lists? Almost every team said explicitly that the factors on their lists were correct. In two cases, they identified that the factors were similar but that different wording had been used to describe the same thing, which they saw as a good thing. One team explained that the list might differ because they had different roles during the scenarios and therefore focused on different things. The factors in one team were explained as success factors.

2. Is there any list that is closer to reality? Many of the teams agreed that the lists were equally close to the truth and therefore answered "No" to the question. One team emphasized that the lists are dependent on what role one might obtain and therefore becomes more relevant in some cases. Another team argued that they had similar lists, which was good. Another team found their lists to be complete.

3. Why are certain factors important for the situation? Some of the teams mentioned communication as an essential factor for handling the situation. One team mentioned that the factors are important because they are supposed to experience similar situations while working but then actual lives are at stake. Another team pointed out that some of the factors are important as they are the reasons why the situation can be solved in a good way. One team underlined the fact that it does not work without communication, but that communication does not work without information. They meant that the factors complement each other.

4. What does **a chosen subject from the lists** mean for your teamwork? For one team the factor communication was chosen. All members agreed that communication should be adequate information that one

gives but also adequate information one receives. Communication was also chosen in another team, which discussed the fact that communication is key within the team and pointed out it is crucial that communication is clear. One team got to discuss the factor leadership. They mentioned that leadership should be clear, since it is through leadership that the operation can be managed in a good way.

Evaluation with instructors

The interviews with instructors were analyzed using thematic analysis (Braun & Clarke, 2006). The analysis resulted in three themes (Pros and Cons, Approaches, and Education Initiative).

Pros and Cons

The theme *Pros and Cons* consists of four sub-themes. This theme illustrates the better and poorer aspects of the courses and Shared Priorities. One person mentioned that the time aspect matters, which accords with another person's statement "too little time for that". This is an example of the sub-theme *Liability*. They try to point out that Shared Priorities must be better integrated for participants to be able to use it properly. Looking at the positive aspects, there are comments from the sub-theme *Contribution* as "helpful in the evaluation" and "overview of important thing". This can be interpreted as how Shared Priorities can be a tool to support the instructors during the course, especially in their evaluations. It is also pointed out that it helps the instructors provide an overview of what is important and in that way. The indicators from the ETS are also mentioned as a good tool during the interviews. One comment involved the chronological order the indicators provide and that it is very helpful to have them. The indicators become a tool that facilitates the work of the instructors. These statements are a part of the sub-theme *Support*. Another important part of the theme is the sub-theme *Relevance*, were the comment "the feeling that is helps" from an instructor indicates that it is important for the instructors that see the benefit of the Shared Priorities instrument. In the same sub-theme, another person stated that it is important to keep in mind that quality is more important than quantity. This suggests that Shared Priorities is not appropriate for all types of scenarios and it could become a nuisance in the long run, more than a helpful tool. It is important that the instructors find it useful as they are the ones engaged in the course and are the ones who are in direct contact with the participants.

4.3.2 Approaches

The theme *Approaches* consists of two sub-themes. This theme covers the approaches the instructors take on at the courses at KMC. The first sub-theme, *Usage*, refers to when it is appropriate to use Shared Priorities. One important comment is "the more complex the exercise, the more rewarding it is (*to use Shared Priorities*)". Furthermore, another comment aligns with this idea, "where there is a greater ambiguity". This indicates that it is better to use Shared Priorities when the scenarios are more complex rather than for small, quick scenarios. This could be interpreted to that some of the scenarios were being too easy to bother using Shared Priorities and then it is not worth it. For Shared Priorities to be an aid the scenario must be challenging, which then would result in carefully considered lists rather than unreflected lists. The second sub-theme, *Adapted Working Method*, brings up how the instructors work during the courses in different respects. Comments that highlight how they work towards the teams are "asks the team" and "asks counter-questions". These statements show how the instructors try to point out that the participants are in focus and are pushed to reflect on their decisions while also challenging them by asking questions. Another important aspect of the sub-theme is the amount of experience the people taking the course obtain. An example that imply this is "We try to adapt to the participants". This means that depending on whether it is a returning team or a beginner-team the instructors adapt their way of teaching. Regarding feedback, which is another part of the sub-theme, comments were given that involved how the instructors worked during the courses. It could be by giving concrete feedback or directing focus if the participants are heading in the wrong direction.

4.3.3 Education Initiative

The third and last theme is *Education Initiative*, which consists of two sub-themes. *Lesson*s refers to how the instructors see Shared Priorities as a learning tool. Example from this sub-theme are "When you are forced to reflect on different things, I think there will be an increase in learning", "more of an aha-experience" and "filling in them without reflecting". This implies that the instructors believe that the use of Shared Priorities could increase learning for the participants if it is done correctly. However, there is a risk of the participants filling them in without really reflecting about the scenario which would meant that the point of Shared Priorities is lost. The second sub-theme is *Findings*, where examples are "useful as a reflection tool", "identify additional success factors", and "there are success factors but other types of success factors". This implies that the

instructors believe that Shared Priorities would work, especially as a reflection tool during the courses. Shared Priorities seems to be able to identify further success factors, but that those factors differ from other success factors, mainly the factors used in the ETS, which have been stated as success factor by an instructor.

DISCUSSION

Can Shared Priorities be a useful tool for the instructors to promote reflection? The interviews and the thematic analysis indicate that Shared Priorities can be a useful tool to encourage reflection if there is time set aside.

Looking at the result and discussion from the interviews where the participants were asked to voice their opinion it is difficult to estimate the value of using Shared Priorities as a tool. The instructors, who are the possible users of Shared Priorities, seem to have a positive attitude towards Shared Priorities. The time aspect must be kept in mind, to make it valuable for the courses time needs to be set aside for the usage of Shared Priorities. It would help the instructors mostly during evaluation but also as a reflection tool for the participants. Daudelin (1996) argued that reflection is a process that will result in learning, which would be good for the participants as they would have an opportunity to learn even more.

Three themes emerged from the interviews with the instructors: *Pros and Cons*, *Approaches*, and *Educational Initiative*. The main points from these themes are that SP can be used as a reflection tool in the PS-courses if the course is planned to include Shared Priorities. The instructors believe that it can be a helpful tool for them. Considering the instructors' perspective, anything that will facilitate teaching is worth to keep in mind. It is important to have their opinion on what to add during a course as they are the ones who need to feel that it is contributing for the better rather than having a tool that steals time from learning.

The contribution of this paper is that by offering a systematic approach for feedback this provides instructors and trainers a way of directing feedback to teams and participants which in turn is expected to enhance learning.

Future work

An experiment where team learning is measured and where controlled use of the Shared Priorities instrument for providing feedback is contrasted to a control condition (no Shared Priorities input) would be a noteworthy continuation.

Conclusion

Improving training is a constant challenge. The small steps bring you forward at a steady pace. When training teams to master prehospital medical command and control, reflection is important as a means to learning. The Shared Priorities instrument seems promising in providing a sound basis for reflection if used correctly. The possible use can easily be extended to other crisis response training situations as the instrument is not dependent on technology and only requires a short introduction for both participants and instructors.

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