



UNIVERSITY OF GOTHENBURG  
FACULTY OF EDUCATION

# Instructions and Generalizations

## Post-Simulation Debriefing in Maritime Training

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Thesis:	30 credits
Program and/or course:	International Master Program in Educational Research PDA184
Department:	Faculty of Education
Level:	Second cycle (advanced)
Term/year:	Spring 2016
Supervisor:	Hans Rystedt, Oskar Lindwall
Examiner:	Jonas Ivarsson
Rapport nr:	HT16 IPS PDA184:4

## Abstract

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Keywords: context, debriefing, maritime training, post-simulation-based, process

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**Purpose:** The purpose of this study was to investigate post-simulation debriefing in maritime training. For this purpose, the scope was divided into two focal areas: the process of post-simulation debriefing and instructions in post-simulation debriefing. For each focal area, three research questions have been formulated and used as a support to give the study direction. In the matter of the process of post-simulation debriefing, the aim of the research questions was to identify the structural components of the debriefing process. As for the instructions in post-simulation-debriefing, the aim was to understand how the subject was taught.

**Theory:** The theoretical background presents a panoramic view of debriefing, which includes the origin and concept of debriefing, the process of debriefing as well as the critical aspects of debriefing. As for the origin and concept of debriefing, the theoretical background depicts how historical roots have shaped various concepts of debriefing. Subsequently, an assortment of various conceptual frameworks, models and strategies provides perspectives on the process of debriefing. Henceforth, the subsection titled “critical aspects of debriefing” describe crucial features of previous research. This section presents perspective on instruction, elements of debriefing, how concepts and elements of debriefing can be understood, teaching in debriefing and standards of best practice, leadership in debriefing as well as a view of the contemporary position of previous research.

**Method:** This study chose an educational environment of maritime training using Bridge Operations Simulators. Exercises or tasks were conducted in these simulators, where the debriefing sessions were held after a simulation-based exercise or task. This study was an extension of a research project and focused on approximately 16 hours of video data, where each video clip was between 2-12 minutes, involving three instructors at different occasions and in total involved 10-20 students. The study had an inductive approach, used video as a data collection method and was based on an observational approach. The data material was systematically managed, where the selected data was based on the relevance of the research objectives. Subsequently, the analysis method consisted of procedures in the shape of coding and transcripts.

**Results:** The study resulted in several findings. First, the structure of post-simulation debriefing in maritime training consisted of both a general process as well as a specific process. The general process included three main phases, such as the initial phase, the central phase and the final phase. In turn, each phase involved several key steps that formed the specific process of post-simulation debriefing. These key steps emerged as the introduction of the debriefing session, overviewing the simulation-based exercise, framing and defining the problem, specifying the simulation-based scenarios, problem analysis and problem solutions,

key lessons and summaries, the closures of debriefing and finally, the purposes with and goals in debriefing. Despite this, during the debriefing process, procedures that involved instructional guidance, the contrasts between general and specific information as well as various forms of generalizations were prominent features. As a consequence, these procedures verified that the various practices, for instance, troubleshooting, evaluation and generalizations, consistently occurred. It confirmed that the key steps in post-simulation debriefing process, in its consecutive order, were not affirmed. Rather, the process of post-simulation debriefing was flexible and consisted of versatility.

## **Acknowledgements**

I would sincerely like to express my great gratitude to my supervisors Hans Rystedt and Oskar Lindwall for the collaboration over the past two years. It has been a great privilege to have gotten to know the research environment, great researchers and teachers, and inspiring leaders within this field – like you. I am also highly grateful for the opportunity of being involved in the research project, conduct a research study and write my master thesis through the participation. Thank you for respecting my research interest, taking time to guide me regularly and thoroughly as well as supporting me throughout this process.

I would also like give many thanks to all involved roles in the IMER-program for this fantastic experience over the past two years; the inspiring teachers and researchers, the invaluable and life-long knowledge and skills as well as the provided support. I am highly grateful for the opportunity.

Finally, I would like to thank my nearest and dearest for having great patience with my time, for showing unconditional support and for constantly showing love. This thesis is dedicated to you.

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## Introduction

In maritime education, full mission bridge simulators enable training of the operations performed on board a real ship. Operating, navigating and manoeuvring in various weather conditions and environments in different areas strives to reinforce understandings about the profession's practical situations. The maritime environments have a high-risk nature that puts high demands on professional behaviour. Risk and safety intelligence have a decisive role for the prevention of consequential events, situations and actions. Simulation-based training is therefore regarded as a fundamental factor for increasing professional competence.

The concepts of debriefing have its historical roots in high-risk domains such as the military, aviation, psychology and medicine. In these domains, performances were evaluated and assessed relative to the learning and/or study objectives (Gardner, 2013; Fanning & Gaba, 2007). Both Gardner (2013) and Fanning and Gaba (2007) argue that these processes of debriefing served a natural influence in the educational field. Besides them, several researchers agree on that debriefing is an essential component in simulation-based education. In this matter, debriefing is affirmed as a process that fosters learning and development (Cant & Cooper, 2011; Decker et al., 2013; Dennehy et al., 1998; Der Sahakian et al., 2015; Gardner, 2013; Kihlgren, Spanager & Dieckmann, 2015; Kolbe, Grande & Spahn, 2015; Wang, Kharash & Kuruna, 2011; Zigmont, Kappus & Sudikoff, 2011a). The traditional debriefing process is explained to take place after a simulation-based task or exercise. In these sessions, real-time scenarios from the simulation-based exercise are viewed and discussed by the learners as well as the instructor, where the performances are evaluated and assessed. In particular, researchers clarify that skills in action-taking and decision-making are examined in contrast to the learning objectives. Several researchers state that the goal of debriefing is to reinforce performance of best practice through interactions and instructional teaching (Crookall, 2014; Chronister & Brown, 2011; Decker et al., 2013; Dufrene & Young, 2014; Gardner, 2013; Gural and Levy, 2009; Kolbe et al., 2015; Shinnick et al., 2011).

Previous research has primarily focused on the debriefing process and standards of best practice. From an educational perspective, several fields of knowledge evolved into focal areas. One focal area was the conceptualization of debriefing, where several researchers have made attempts in defining debriefing. As a consequence, several researchers have endeavoured to affirm numerous steps that form the process of debriefing. In this manner, studies have developed strategies and models for effective debriefing as well as standards of best practice. Similarly, the field of educational leadership have focused on the role of the educator, the educator's requisites as well as the approach of the educator. Even in this context, previous research has discussed and developed standards of best practice. Another focal area was development of the individual relative to learning objectives. In this matter, behavioural and cognitive ideas contributed to perspectives about the functioning of the individual. Likewise, previous research developed strategies in how individual potential could be utilised in order to develop a specific skill (Crookall, 2014; Decker et al., 2013, Dreifuerst, 2009; Ledermann, 1992).

In conjunction to this, several researches claim that debriefing as a field of knowledge yet have many gaps that need to be covered by educational researchers. In this regard, previous research has not yet explored the field in particularly maritime education. For this reason, the aim of this study was to investigate post-simulation debriefing in maritime training. It involves two focal areas: the process of post-simulation debriefing and instructions in post-simulation debriefing. As for the process of post-simulation debriefing, the aim was to identify the structural components of the process. Regarding the instructions in post-simulation-debriefing, the aim was to understand how the subject was taught.

This study chose an educational environment of maritime training using Bridge Operations Simulators. Exercises were conducted in these simulators, where the debriefing sessions took place after the simulation-based exercise. The primary direction of this study was qualitative and based on the inductive approach, where the main idea is that empirical findings provide theoretical outcomes. Furthermore, it used video as a data collection method, and an observational approach where the data material was analysed through procedures of coding and transcripts.

The disposition of this thesis begins with an introduction that from an overall perspective describes the field of study. Thereafter, the review of research presents information about the chosen topic and the contribution of previous research, followed by the aim and research questions of this study. In turn, the section of method describes the methodological procedures of this study and includes explanation of the setting and data collection method, data selection, data management and data analysis method as well as the position in research ethical principles. Continuously, the section of results presents the prominent findings of this study. Subsequently, in the section of discussion and conclusion, the research questions are answered where the findings of the study and the prior research are linked.

## Background

This section outlines the theoretical background that consists of secondary material, in terms of literature review and previous research. The theoretical background is related to the aim of the study and is used to support the discussion in a later section. It aims to provide a relevant content and reinforce understandings about the chosen subject area. The areas that are relevant for the study describes the origin and concept of debriefing, the process of debriefing and critical aspects of debriefing.

As for the origin of debriefing, the historical roots of debriefing dates back to World War II. During this time, the United States (US) Army Brigadier General and Chief Historian, Samuel Lynn Atwood Marshall conducted interviews-after-combat (Gardner, 2013). After a military combat mission, individuals were interviewed in groups and the given information was documented in details. According to Gardner (2013), the aim of these sessions was to solely describe the events. As a consequence, this method was further developed to a systematic process that analysed the activities, strategies and results of a mission. Subsequently, the given information was used for improving and developing military strategies (Gardner, 2013; Fanning & Gaba, 2007). Gardner (2013) explains that the method was applied to after simulated battle exercises. In this context, a senior military leader observed, evaluated and gave feedback to the individuals about their performance, which was also known as performance critiques (Gardner, 2013). The systematic analyses of the missions and exercises was and is in its entirety known as After-Action-Review (Dennehy, Sims & Collins, 1998; Gardner, 2013). The traditional method of performance critiques was transformed by the US Army Research Institute of Behavioural and Social Sciences in the early 1970's. The process of subjective assessment and feedback was altered to a process of objective evaluations. In this case, the After-Action-Review was conducted by the individuals themselves in groups where the performances were evaluated (Dennehy et al, 1998; Gardner, 2013). Gardner (2013) as well as Fanning and Gaba (2013) explained that guided group discussions aimed to keep the strengths sustained and the weaknesses improved. In turn, the process fostered self-reflection, learning and group development (Gardner, 2013; Fanning & Gaba, 2007).

The term debriefing also originates from the aviation industry and was considerably brought to attention after the crash of Eastern Airlines Flight 401 in Miami, Florida in 1972. In response to the accident, the formal training of, what was known as, Cockpit Resource Management was redesigned to Crew Resource Management (CRM). The CRM training programs included full mission flight simulation training; also known as Loft Oriented Flight Training (LOFT), the concept of debriefing, and involved all members of the crew such as pilots, air traffic controllers, maintenance personnel and flight attendants. The formal guidelines were first released by National Aeronautics and Space Administration (NASA) in 1981. These guidelines have systematic structure and a substantial scope that serves as a base for the training programs. The objectives of these is described as it to reduce human errors, reinforce knowledge and skills, implement judgmental accuracy, decision-making and action-taking and thus, prevent accidents (Gardner, 2013).

Debriefing also exist in the discipline of psychology, where research studies, with experimental and/or laboratory focuses, controlled and manipulated the empirical procedures (Dennehy et al., 1998). Gardner (2013) describes that to debrief was to inform the participants, instruct them and educate them in order to study the different outcomes. Another method in psychology was formed in the 1980's and is called Critical Incident Stress Debriefing (CISD). This method of debriefing specializes in treating the mental and physical state of traumatic-, disaster- and combat-related stress. Several researchers explained that the method aimed to form and foster healthy behaviours (Dennehy et al., 1998; Gardner, 2013; Fanning & Gaba, 2007).



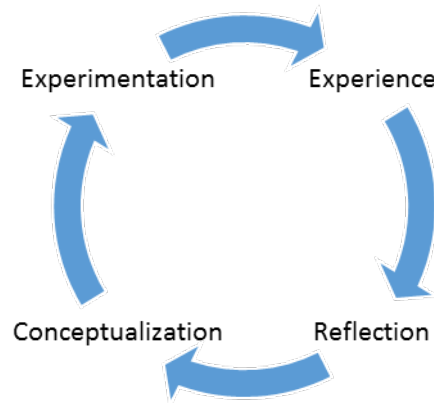
Both Gardner (2013) and Fanning and Gaba (2007) emphasize that the historical roots of debriefing provides a further understanding about its natural influence in the educational field and its present role in various educational disciplines. Besides them, several researchers explain that debriefing is an essential component in simulation-based education (Cant & Cooper, 2011; Decker et al., 2013; Dennehy et al., 1998; Der Sahakian et al., 2015; Gardner, 2013; Kihlgren, Spanager & Dieckmann, 2015; Kolbe, Grande & Spahn, 2015; Wang, Kharash & Kuruna, 2011; Zigmont, Kappus & Sudikoff, 2011a). The traditional practice of debriefing takes place after the performed simulation-based task or exercise (Kolbe et al., 2015; Shinnick et al., 2011). This practice involves interactions between the learner, the group of learners and the educator(s) where the completed task(s) or exercise(s) is discussed and explored (Reed, Andrews & Ravert, 2013). Gural and Levy (2009) emphasize that the goal of debriefing is to teach the learners to perform their work as well as possible; hence to reinforce performance of best practice that meet the learning objectives. In order to achieve this, Chronister and Brown (2011) argues that guided discussion is a necessary practice in debriefing. In this matter, Ledermann (1992) explains that the educator uses the information that is generated in the simulation-based experimental activity and tests the learner(s) procedures and approaches to the learning objectives. In this process, the educator identifies and closes gaps in knowledge and skills by providing feedback, questioning and strive to maximize learning. In this regard, several researchers describe group discussions in debriefing as social practices that enable the learners to actively participate in analysing the situations (Dieckmann, 2009; Fanning & Gaba, 2007; Petranek, Corey & Black, 1992).

In addition to this, several researchers explain that in debriefing the learners assess their decision, actions, communication and ability to deal with specific situations, which allows them to verbalize their thoughts on the consequences of their actions. In this context, they further explain that feedback is an essential component in debriefing where the educator provides information about the learner(s)'s performance and a specific standard in the learning objectives. By giving concrete and directed information, the educator intends to improve the learner(s)'s performance (Crookall, 2014; Decker et al., 2013; Dufrene & Young, 2014; Gardner, 2013). On the contrary, Edelson and LaFond (2013) argues that there is a difference between providing feedback and debriefing. While feedback provide concrete and directed information and is integrated in debriefing, debriefing *per se* is an interactive process of discussion, where knowledge, experience and reflections are guided by the educator (Edelson & LaFond, 2013; Eppich et al., 2015). Both Gardner (2013) and Ledermann (1992) explain that the guidance provide insight into the activity where the learners are taught and encouraged to review their own actions and performance, analyse their experiences and create ideas of possible changes. In this context, the learners are invited to give factual descriptions of the event, emotional ventilation and identify the possible errors (Gardner, 2013; Ledermann, 1992). In conjunction to them, several researchers emphasize that debriefing enable the learners to freely express their thoughts, comment, agree and disagree with each other and draw the lessons that aim to be learned. As a result, judgmental accuracy, decision-making and action-taking skills would be developed (Beaubien & Baker, 2003; Fanning & Gaba, 2007; Wickers, 2010). Dreifuerst (2009) describe that a debriefing-activity that is overseen by the educator aims to reinforce a targeted behaviour. Thus, and first, the participation need to contribute to a meaningful experience where, second, the processing of that experience provide insights into that experience and its consequential impact (Dreifuerst, 2009).

## The Process of Debriefing

Numerous strategies and models have been developed in order to describe the debriefing process. According to Atkinson and Delamont (2010), models provide information and increases understandings about the system of a phenomenon. In comparison to this, they further explain that strategies are methods that consist of several activities (Atkinson & Delamont, 2010).

As for models, previous research frequently refers to specifically three models. One of these models is Kolb's learning cycle. This model portrays the learning process and is based on the perspective of experiential learning (Cant & Cooper, 2011; Gardner, 2013; Zigmont et al., 2011b).



**Figure 1** Kolb's learning cycle. This model illustrates the key phases in the learning cycle (Gardner, 2013).

As illustrated (see figure 1), the model includes experimentation, experience, reflection and conceptualization. According to this model, the experimentation in simulation-based education is carried out as a practical task or a practical exercise in which knowledge is attained. In this knowledge, experiences are developed from the practical task or the practical exercise and has various of forms; such as emotional, physical and rational. In turn, the experiences awaken reflections in which the learner(s) retrospectively reflects on their performed actions and compares them to the learning objectives.

Several researchers explain that through reflections, the learner(s) gain insights, ideas and thoughts that are in turn conceptualized and formed as knowledge. Once the cycle is completed, as the model shows, the gained knowledge will once again be used, tested and assessed another experimentation (Cant & Cooper, 2011; Gardner, 2013; Zigmont et al., 2011b).

Another model is known as the Learning Outcomes Model and is a developed model that is based on Kolb's learning cycle. Based on Kolb's learning cycle, this model captures additional main features in simulation-based learning and the debriefing process (Zigmont et al., 2011b). The model involves three essential aspects; the individual, the experiences and the environment. These aspects form the perspective of effective practice-based learning.

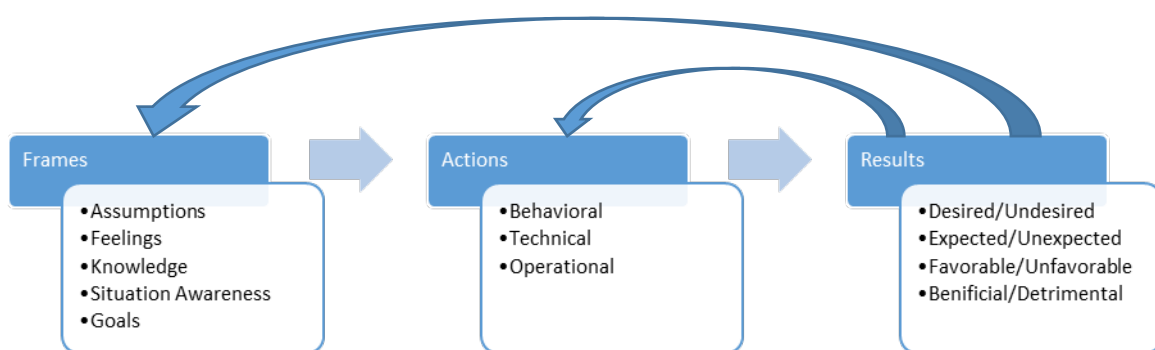


**Figure 2** The Learning Outcomes Model. This model includes three essential aspects for effective practice-based learning (Zigmont et al., 2011b)

Zigmont et al (2011b) explain the individual as an adult learner who has active engagement in learning, analogical reasoning and mental models of practice. In this matter, analogical reasoning is explained as the process of reasoning where similarity and comparability between two points leads to a conclusion based on one’s experience of a situation. Also, mental models are psychological representations that are based on realistic, hypothetical and imaginary understandings of specific activities or situations. As experiences can be emotional, physical or rational, these contribute to various forms of reflections and understandings. In order to enhance these, Zigmont et al. (2011b) explain that the educator have a crucial role in creating a supportive learning environment for the learning. This learning environment is described to navigate learners in the group discussions, encourage reflections, experience and knowledge to be shared and provide guided feedback (Zigmont et al., 2011a; Zigmont et al., 2011b).

Previous research has used these models as conceptual frameworks, or learning theories. They emphasize these models as fundamental for understanding the debriefing process. Evidently, they are used as a direction, or a rationale, in the research studies (Cant & Cooper, 2011; Gardner, 2013; Zigmont et al., 2011a; Zigmont et al., 2011b).

Based on these models, Rudolph et al (2006) have developed a model that describes the system of the debriefing process. This system is explained as relational and includes the relationships between frames, actions and results (Gardner, 2013; Rudolph et al., 2006).



**Figure 3** Rudolph’s system of the debriefing process. This figure shows how the relationship between frames, actions and results forms the system of the debriefing process (Rudolph et al, 2006).

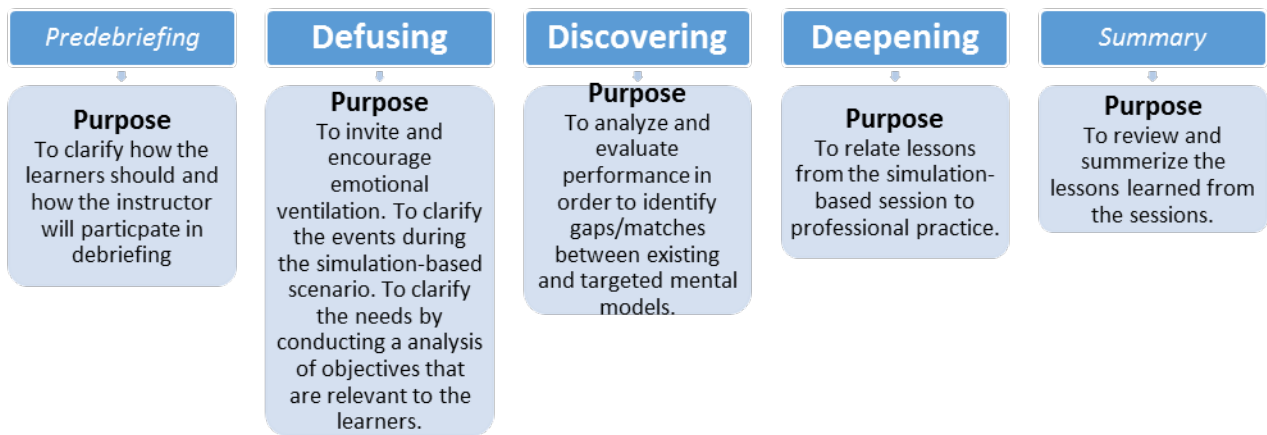
As illustrated, frames involve abstract qualities such as; assumptions, feelings, knowledge, situation awareness and goals. These are described as invisible, but inferable, and is aimed to be uncovered and expressed. While frames are invisible, actions are observable and is portrayed as behavioural, technical or operational actions. According to this model, actions provide specific results, which can be desired or undesired, expected or unexpected, favourable or unfavourable or beneficial or detrimental. By evaluating the results of the learners, the educator can go back to the learner's actions and increase the understanding of what drove the specific action (Gardner, 2013; Rudolph et al., 2006).

The differences and similarities between the models can be recognized in their perspectives and their concepts. As for the perspectives, Kolb's learning cycle is based on the perspective of experiential learning, which simply means that the learning process and knowledge development is based on experiences. In contrast, the Learning Outcomes Model is based on the perspective of effective practice-based learning, which means that practical orientation fosters the learning process and knowledge development. Although their perspectives differ from each other, these models are conceptual frameworks that function as different angles that can be used in order to reinforce understandings about the context of debriefing. In regard to the context of debriefing, Rudolph et al (2006), on the other hand, have endeavoured to capture the overall context of the debriefing process. This system of the debriefing process includes both perspectives from Kolb's learning cycle and the Learning Outcomes Model.

As for the concepts, Kolb's learning cycle include active experimentation as a practice. In comparison to this, the Learning Outcomes Model exclude it as a concept and instead, uses effective practice-based learning as a perspective. In Rudolph's system of the debriefing process, this perspective, along with Kolb's explanation of active experimentation, fall under the concept actions. On the other hand, what Rudolph's system of the debriefing process as well as the Learning Outcomes Model have in common with Kolb's learning cycle are the concepts based on the individual, the experiences, the reflections, the conceptualizations and the frames. From Kolb's perspective, active experimentation provides concrete experiences that are retrospectively reflected on and in turn, conceptualized. In the Learning Outcomes Model, this is recognized as the experiences as well as the individual, while it falls under the concept of frames in Rudolph's system of the debriefing process. Apart from this, neither Rudolph's system of the debriefing process and Kolb's learning cycle describe the significance of the learning environment. Learning environment is a concept that is included in the Learning Outcomes Model.

Based on these models, previous research has developed strategies that describe the debriefing process. According to Decker et al (2013), strategies are used as tools in order to assure quality, achieve goals and highlights standards of best practice (Decker et al, 2013).

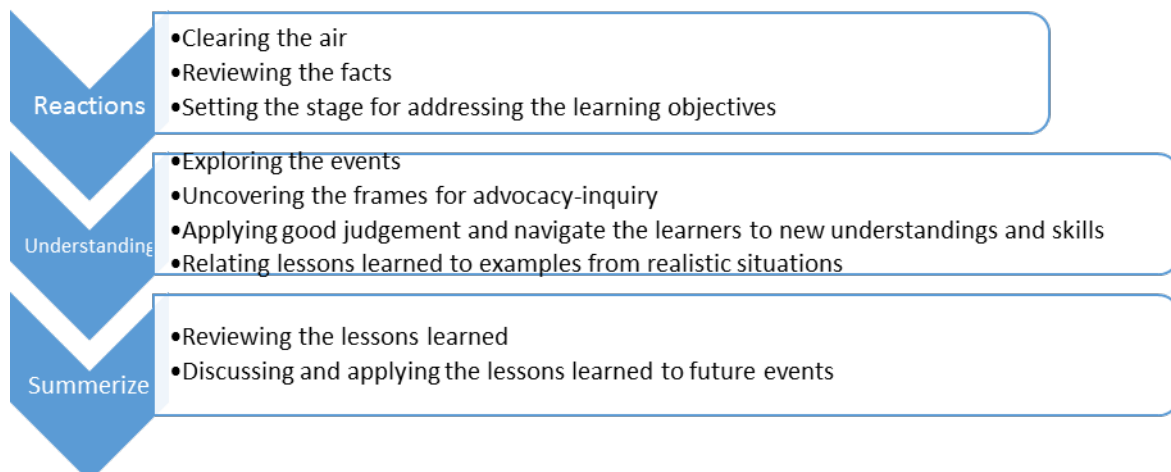
In regard to this, Zigmont et al (2011a) have developed a model, called the 3D-model and is designed to address the individual and the experience in both small and large learning environments.



**Figure 4** The 3D-model. This model illustrates the start, three core elements and the final phase of the debriefing process (Zigmont et al, 2011a)

As illustrated in figure 4, the model starts with a predebriefing, followed by three major phases, defusing, discovering and deepening and ends with a summary. During the first phase, predebriefing, the role of the instructor is clarified, the expectation for learner participants are explained, the content and the structure of the debriefing session is explained as well as the time elapse for each debriefing session. The second phase, defusing, strives to elicit reactions and emotions from the simulation-based experience where the simulation-based scenario is described and discussed. The third phase, discovering, identifies the observed behaviour and the outcomes. The instructor can ask questions in order to discover a specific mental model and guides the learner to a targeted action. Moreover, the fourth phase, deepening, prompts the learner to connect new knowledge to professional practice and aims to reinforce professional behaviour. The model ends with a summary, where the lessons learned from the session are re-explained, reviewed and summarized (Zigmont et al., 2011a).

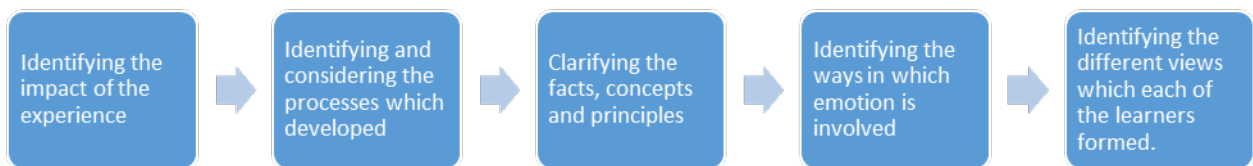
One strategy is described by Gardner (2013) and can be understood as a step-wise strategic process that includes three stages or phases.



**Figure 5** Step-wise strategy in debriefing. This figure shows the different steps and the content of different steps in post-simulation debriefing (Gardner, 2013).

According to the model, the stage of reactions occurs immediately after the simulation-based task or exercise. During this stage, the debriefing sessions is encouraged to start by listening to the learner’s experienced reactions and emotions about their own actions or performance as well as the specific simulation-based event or scenario. Subsequently, the educator reviews these shared facts and guides them towards the learning objectives. In this case, guiding such reactions aim to lead to an increased understanding. Thus, in the stage of understanding, the learners and the educator explores the events and the actions. In this stage, Gardner (2013) explain that one of the educators’ tasks is to uncover abstract qualities in order to understand what drove their actions. By evaluating this way, the educator can subsequently guide the learners to new understandings and skills and increase the understanding by relating their actions to examples from realistic situations. In the final stage of the model, the educator further strives to reinforce understandings by summarizing the debriefing by reproducing the given information. In this case, Gardner (2013) explains that by reviewing the lessons learned, and in turn, discuss them, provides a deeper understanding of how learning outcomes can be applied to future events (Gardner, 2013).

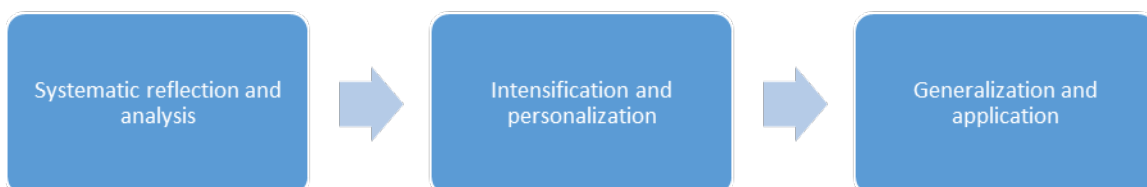
Furthermore, another strategic process is demonstrated by Fanning and Gaba (2007) and includes aspects that aim to be used in order to reinforce learning and development in the debriefing process.



**Figure 6** Strategic process. This figure illustrates several steps in a strategic process that can be used to reinforce learning and development in the debriefing process (Fanning & Gaba, 2007).

Fanning and Gaba (2007) explain this process to function as a series of activities that are interweaved. As illustrated, first, by evaluating and assessing the practical impact of the experience would increase understandings of what processes that were developed. This way, the educator can identify performance gaps and guide the learner by clarifying facts, concepts and principles. Subsequently, it increases understandings of what emotions were involved in the experience, where the educator can identify the different views that the learners have formed (Fanning & Gaba, 2007).

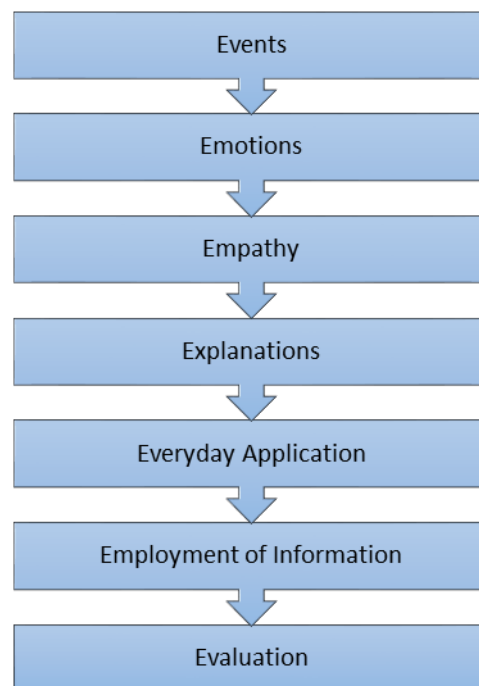
Additionally, one strategy that includes a similar approach is formed by Ledermann (1992) and is described through three stages or phases.



**Figure 6** Ledermanns’ three phases. This figure shows the three different phases of post-simulation debriefing (Ledermann, 1992).

According to this process, the initial phase, systematic reflection and analysis, introduces a systematic self-reflective process about the experienced events in the simulation-based task or performance. In turn, the learner's share descriptions of the simulation-based event that are reviewed and discussed. This interaction enables the intensification and personalization of the learners' experience and reflections and thus, enables the adjustment of misconceptions or stress responses. Ledermann (1992) claims that the aim of is to reinforce the meaning of the experiences that, in turn, can be generalized and applied to future events (Fanning & Gaba, 2007; Ledermann, 1992).

Moreover, another strategic process is formed by Petranek et al (1992) and is known as the E's of debriefing. This strategic process deals with the inner aspects of the learners and their relationship to the educator.



**Figure 8** The E's of debriefing. This figure highlights the inner aspects of the learners and their relationship to the educator (Petranek et al, 1992).

According to this, the first phase, events, encourages the learners to share their descriptions of the simulation-based events. In conjunction to this, and the second phase, emotions, the learners are encouraged to share their emotions regarding their experiences of the simulation-based events. In turn, and the third phase, empathy, the learner should reflect on the other learners' experiences and emotions, where the whole team is encouraged to discuss them. Subsequently, and the fourth phase, explanations, invites the learner to review and analyse their overall experience. This leads to the fifth phase, everyday application, where the learners reflect on their actions and performance as an application in the professional setting, not in the simulation. Based on this, and the sixth phase, employment of information, enables the learners to understand how they translate the skills and emotions from the simulation to professional work life. In this regard, and in the seventh phase, the learner evaluates what significant actions that can be applied and what actions were insufficient and needs to be improved (Fanning & Gaba, 2007; Mayville, 2011; Petranek et al., 1992).

Furthermore, Cant and Cooper (2011) explains the following debriefing strategy as a performance strategy which aims to efficiently conduct the debriefing session through three stages where each stage has several educational requirements.

<i>Debriefing Stage</i>	<i>Educational Requirements</i>
I. <i>SET</i> <i>Preparation</i>	<ul style="list-style-type: none"> <li>▪ The development and training of the educator</li> <li>▪ Setting an appropriate environment</li> <li>▪ Preparing the learner by suggesting a plan and inform objectives</li> </ul>
II. <i>DIALOGUE</i> <i>The debriefing</i>	<ul style="list-style-type: none"> <li>▪ Describing the event</li> <li>▪ Analysing the event</li> <li>▪ Apply the event</li> </ul>
III. <i>CLOSURE</i> <i>Final summary</i>	<ul style="list-style-type: none"> <li>▪ Answering final questions</li> <li>▪ Summarizing key learning points.</li> </ul>

**Figure 9** Debriefing Performance Strategy. The figure shows the different stages of debriefing and the educational requirements of each stage (Cant & Cooper, 2011).

According to this strategy, the first debriefing stage, set, is based on the preparation of the debriefing sessions in order to maximally fill the potential of efficiency. Cant and Cooper (2011) mean that the idea of preparing an educator with debriefing education aims to contribute to adequate preparation of the environment as well as the learner. The core principles in the first debriefing stage consist of time, constructive approach, non-judgmental approach as well as direct observation of the scenario. In this case, time needs to be efficiently used where the preparation of the learner is constructive and non-judgemental and the educator holds a direct observation of the scenarios. Moreover, the second debriefing stage of the strategy, is based on the debriefing process where events are described, analysed and applied as examples to professional practice. In this stage, the learners share strengths as well as weaknesses in their performance where the educator adds points in their success as well as for their improvement. Subsequently, the third debriefing stage closes the debriefing process by answering final questions and summarize the strengths as well as the weaknesses in their performances. In this case, the educator need to answer the questions prior to the final summary of positive performances (Cant & Cooper, 2011).

These strategies and models highlight the natural order of human processing; such as experience, reflection and cognitive processing as well as the practical structure of debriefing; such as involved roles, discussions and environment. Fanning and Gaba (2007) emphasize that the debriefing processes are structured and in turn, consist of several core elements. One of the structural elements is the debriefer, who is described to have the role as the educator. Another structural element are the participants involved in the debriefing context and is equivalent to the individual learner or a group of learners. The third structural element is the experience in the simulation-based scenario and the fourth structural element is the impact from that simulation-based experience. The experience in the simulation-based scenario has an impact on the learner(s) that can be emotionally, physically or rationally loaded. The fifth structural element is recollection which highlights the content and process from the experience-based memory, whereas the sixth structural element deals with reporting the experience-based memories in a knowledge-based verbal or written form. The seventh structural element, time, is described to have a decisive role in the experience of a simulation-based scenario and the impact of that experience. Depending on how much time the task or exercise is, experiences will be understood differently. Fanning and Gaba (2007) emphasize that regardless of what discipline the debriefing process takes place in, these elements are constant and thus, determines their fundamental involvement in debriefing.



## **Critical Aspects of Debriefing**

In this section, critical aspects of debriefing are presented. The section describes previous research's outlook on the imperative features of debriefing. It begins with a description of perspectives on instruction in relationship to debriefing. In turn, several essential elements of and in debriefing are presented, followed by various teaching approaches in debriefing and their standards of best practice. In this regard, various perspectives on the leadership in debriefing are presented, followed by the contemporary position of previous research.

### **Perspective on Instruction**

Previous research has contributed with, identified and defined several instructional strategies and approaches that plays a significant role in contexts of learning and development.

Seidel, Perencevich and Kett (2005) present several instructional methods and reviews them from different perspectives. One example is that instruction can be understood as direct or indirect. The direct approach is explained as visible, clear and directly directing learning and development. Examples of this are explicit teaching, mastery coaching, comparing and contrasting, questioning and/or didactic questions, summarizing and elaborative interrogation. On the contrary, the indirect approach is explained as invisible and background acting. Such approaches are concept mapping and forming, reflective discussions and experimental problem solving. Furthermore, both direct and indirect approaches play a significant role in interactive instruction which is characterized by group- and task-oriented learning and development. In these cases, team-work, discussions and problem solving play significant roles. Regardless of what approach is adapted to the learning situation, Seidel et al (2005) emphasize that there is a common goal; which is to reinforce specific attitudes and habits. In conjunction to this, the role of instructions behaves as guidance and is defined as instructional guidance. Instructional guidance includes teaching approaches that are based on what the students know and what the students still needs to know (Seidel et al, 2005). Apart from Seidel et al (2005), several researchers have studied the concept of instructional guidance (Clark, Kirschner & Sweller, 2012; Frey & Fisher, 2010). Frey and Fisher (2010) have studied the concept of instructional guidance in practical contexts and in turn, identified and defined several of its characteristics. First, instructional guidance included learning objectives in terms of theoretical and practical principles. Second, instructions guide the individuals through questions, cues, explanations, reminders and modelling. Third, re-teaching in instructional guidance was a common method in order to ensure that knowledge was gained. Frey and Fisher (2010) have continuously provided examples in how instructional guidance portray themselves. Making inferences, generalization, summaries, clarifying misconceptions or partial understandings, uncovering what is known and not known, are few examples of instructional guidance in practical contexts. Frey and Fisher (2010) also found that the topics were focused on few specific learning targets in the instructional guided setting, where provided instructional guidance were more efficient to a smaller group than a larger group. Another study was conducted by Clark et al (2012) who demonstrate that instructional guidance has a direct and explicit approach. In contrast to what Seidel et al (2005) describe as indirect instructional approach, Clark et al (2012) explain that instructional guidance also has a central role in indirect practical contexts. They explain that instructional guidance “[...] can also include class discussions and activities—if the teacher ensures that through the discussion or activity, the relevant information is explicitly provided and practiced” (p. 6). In conjunction to this, they emphasize that partially or minimal guided approach can be portrayed as different types of learning theories, such as discovery learning, experiential learning, problem-based learning. In these cases, the students practice a task or exercise and receive corrective feedback which is explained as a simple verification of right and wrong.

Clark et al (2012) continue to explain that unguided approaches have a tendency to reinforce the students' unawareness or noninterest and emphasize that "minimally guided instruction can increase the achievement gap" (p. 8). Based on this, they highlight the significance of instructional guidance and explain that instructional techniques with guidance "are highly effective with inexperienced learners" (p.10).

This study joins the perspectives on the concept of instructional guidance, but views it from an angle based on the explanation provided by Billings (2012). That is that feedback should be provided from the beginning of the process, where instructions should have a situational and adaptive approach (Billings, 2012).

## **Essential Elements of and in Debriefing**

Previous research has primarily focused on identifying the roles involved in the debriefing sessions, studying the structure and content of the debriefing process and developing models and strategies that aims to behave as standards for evaluating performance. In a similar vein, several researchers have focused on identifying and highlight specific elements of debriefing. These are regarded as crucial influences that empower standards of best practice in debriefing.

In regard to this, Wickers (2010) highlights the structure and culture of the learning environment in the debriefing sessions and emphasize several aspects that is required for successful debriefing, what is known as the climate of debriefing. According to Wickers (2010), and first, a climate needs to be based on trust, where the learners have a trusting relationship to each other as well as to the educator. Second, Wickers (2010) further explain that the learning objectives as well as the expectations of achievement need to be clarified. Moreover, and third, the learners need to be engaged in the analysis of the simulation-based situation. Fourth, Wickers (2010) explain that the use of video recordings is a powerful tool that contributes to the reinforcement of specific behaviours. Also, and fifth, impromptu learning in debriefing is essential, where communication is characterized as therapeutic and aims to deal with emotions. In addition to this, and sixth, Socratic questions; such as what, when, how and why, aims to augment discussions and foster self-reflections. Wickers (2010) explain that these six aspects reflect a supportive approach from the educator and aims to provide a safe environment that fosters learning (Wickers, 2010).

Moreover, Kolbe et al. (2015) have identified four ingredients; content, structure, attitude and setting, that are essential in forming a debriefing process. According to them, the content of the debriefing process is predefined by the learning objectives. By measuring to what extent and how the actual performance and the desired performance matches or clashes contributes to identifying gaps in the actual performance. In addition to this, by exploring the underlying frames, that are invisible drives of the performed actions, enables the educator to guide the learners in closed gaps and reinforce standards of high performance. Furthermore, the structure of a debriefing process includes three phases; reactions, analysis and summary. In this matter, Kolbe et al. (2015) explain that during the reaction phase, the learners express their emotions, experiences and reflections regarding the simulation-based task. In turn, the educator analyses and identifies the gaps and guides the learners to analyse and reflect their own thinking behind their actions. Subsequently, the educator reinforces behaviour by summarizing the strengths as well as the improvement necessary of their action. In regard to attitude, honesty, curiosity and maintaining a positive regard are qualities that are vital for an effective debriefing process. According to Kolbe et al. (2015), a setting for the debriefing process encourages the learner's feelings of challenges in learning as well as psychological safety. Specifically, in the beginning of the debriefing process, the educator provides an impression of where the learners understand the objectives, expectations and rules of conduct as well as the qualities of attitude, such as honesty, curiosity and maintaining a positive regard.

Another study, contributed by Decker et al (2013), has identified several standards or criteria of the debriefing process that are necessary in order to achieve desired outcomes. One of them is that the debriefing process is facilitated by a person(s) where their role functions as a component in the debriefing process. Moreover, the environment supports confidentiality, trust, open communication, self-analysis and reflection. Additionally, the debriefing process is based on the observation of the simulated experience. Also, and fourth, the debriefing process is based on a structural framework. Based on this, and finally fifth, the debriefing process is congruent with the learners' objectives and outcomes of the simulation-based experience (Decker et al., 2013).

## **Teaching in Debriefing: Standards of Best Practice**

Aside from the models and strategies that researchers have developed, teaching researchers have contributed with practical insights and points regarding debriefing to other teachers and researchers. In conjunction to this, Der Sahakian et al. (2015) have given several points of recommendation to teachers as well as researchers. The first recommendation is that the educator should reflect on their own performance as an educator. Secondly, by establishing simulation ground rules increases the quality of the scenarios and is a fundamental condition for debriefing. Another recommendation is that by having a confederate during the scenarios reinforces the managing of unexpected events and intended learning objectives. Moreover, and fourth, the educator need to respect the debriefing process and implement good practice based on learning theories. In addition to this, and fifth, the educator need to maintain a balance between emotion and teaching by decontextualizing the experiences from the learners in the debriefing session. Also, and sixth, in order to prevent antagonistic events in the learning process, the educators need to share inputs.

In a similar vein, O'Brien and Pedicino (2011) have outlined tips that will lead to successful debriefing sessions. These are formed as stages of debriefing, where the first stage is to examine how the learners are feeling. Subsequently, the second stage is to discuss how the learners worked together, where the focuses are on the problem-solving, assessment skills, roles and responsibilities, communication, support and the practical management of the simulation-based task. Followed by this, the third stage is to explore the simulation-based scenario and discuss how it was handled. Finally, the fourth stage is to summarize the session, which consist of discussions regarding the strengths of the actions, the weakness of the actions and how these, in turn, can be improved. Both Der Sahakian et al (2015) and O'Brien and Pedicino (2011) explain that their practical points and insights aim to increase understandings of particularly the process of debriefing as well as they behave as suggested methods for an effective debriefing.

## **Leadership Approaches in Debriefing**

Several researchers agree on that the debriefing process is a necessary component for learning and development, where the learning outcomes are highly depended on the educators' leadership approach and qualities in the debriefing process (Boet et al., 2011; Decker et al., 2013; Dufrene & Young, 2014, Raemer et al., 2011). In this regard, several studies have focused and discussed various leadership approaches in the debriefing process. Specifically, empirical findings have found that the role of a non-judgemental approach is effective in debriefing, where several researchers have based their studies on this perspective (Chronister & Brown, 2011; Gardner, 2013; Fanning & Gaba, 2007; Wang et al., 2011). A non-judgmental approach is explained as when the educator makes a conscious effort of not being too critical of the actions and thoughts of the learners. Rather, if and when the educator notices a weakness of action, insufficient knowledge or emotionally charged experience, the

educator point this out discretely (Gardner, 2013, Rudolph et al., 2006). Gardner (2013) describes that the non-judgmental approach “often contains judgements that the debriefer tries to hide but tend to leak out through verbal or facial expressions and postures, creating mixed messages for the participant and undermining their trust in the debriefers’ motives” (p. 170). Furthermore, Fanning and Gaba (2007) describes that a non-judgemental approach is when the educator behaves as a co-learner rather than an expert or an authority. In conjunction to this, Dennehy et al. (1998) emphasize that a cooperative role, which is the opposite of a hierarchical or autonomous role, provides a balance based on mutuality between the educator and the learners. In this matter, mutuality enhances the learners’ active engagement and interest for learning. Moreover, Wang et al (2011) highlights facilitative non-judgmental questioning and directed feedback helps the learners to initiate a self-reflective diagnostic learning process. In addition to this, Rudolph et al. (2006) describes that a non-judgmental approach is based on how the educator delivers a critical message while avoiding negative emotions and defensiveness and maintain psychological trust. On the contrary, Fanning and Gaba (2007) questions if the non-judgmental approach is the most adequate approach in ensuring that the learning objectives are met. Fanning and Gaba (2007) highlights that an educator can have various of approaches and that the appliance of such approach depends on the context and situation in debriefing.

The opposite of a non-judgemental approach is a judgmental approach in which the educator gives direct criticism without any consideration of the consequences. In some scenarios, the criticism can be harsh and cause humiliation, dampened motivation and confusion (Rudolph et al., 2006). Rudolph et al. (2006) emphasize that the judgmental approach does not leave the learner in doubt about the educators’ emotions and opinions, which is also referred to the shame-and-blame approach. Compared to several studies that emphasize the essential role of a non-judgemental approach and reject the judgmental approach, Rudolph et al., (2006) explains that both approaches have weaknesses. While the judgmental approach can humiliate the learner directly, the non-judgemental approach deliver nonverbally that mistakes are neither discussable nor shameful: “Mistakes are puzzles to be learned from rather than crimes to be covered up” (p. 52). Rudolph et al., (2006) developed the concept of debriefing with good judgement which is widely used in several research studies. Debriefing with good judgement focuses on several aspects. First, the approach focuses on creating a context in which lessons are learned and moves the learners toward the specific objective(s). Second, the approach focuses on capturing the actions as well as the meaning-making systems (such as frames, assumptions and knowledge). Third, the debriefing session is also based on the educators’ sense-making system, where the expert view or knowledge is a central theme in the debriefing process. From a practical perspective, the educator states both their critical and appreciative insights of the simulation-based exercise or task explicitly. Through a dialogue with the learners, the insights are explored and written. According to Rudolph et al., (2006), a good judgement involves qualities from both a judgmental as well as a non-judgemental approach, where both the appreciation of an expert view and the unique perspectives of the learners are valued. The idea with a good judgment is to explore, identify and analyse the weaknesses and strengths in the learner’s performance as well as what drove their actions implicitly (Rudolph et al., 2006).

In a similar vein, Eppich et al. (2015) have studied the role of feedback and debriefing in mastery learning and deliberate practice in post-simulation-based sessions. Mastery learning requires that the learners make several attempts until the learners master the skill in question and deliberate practice is where expert-level performance is primarily the result of expert-level practice. Thus, robust feedback and debriefing are necessary components in order to promote performance improvement and help the learners to achieve mastery learning goals (Eppich et al., 2015). Eppich et al. (2015) emphasize that previous research has primarily

focused on psychological safety, mutual respect and trust, but have missed out on several practical points. Based on the idea that psychological safety fosters risk-taking and encourages learners to accept challenges, the study have formulated several points that establishes a supportive learning environment. First, the educator need to explain the role and process of debriefing, how and when the learners will receive feedback as well as the significance of specific, directly honest, yet nonthreatening feedback. Second, the educator need to explain that expectations of perfect results at the learners' first attempt is an absurd idea. Being challenged, learn from mistakes and improve from there are factors that are encouraged. In conjunction to this, the educator need to clarify that feedback might be unpleasant and trigger emotionally charged feelings, but that it is necessary for improvement. Third, the simulation-based exercise or task might be interrupted to that the learners can reflect on their performance during an urgent debriefing and return to the simulation for more practice. Fourth, the educator encourages specific, directly honest, yet nonthreatening feedback between the team members and explains its value. Further findings of the study were that the leadership approach of the educator "is much like coaching world-class athletes" (p. 1502). Thus, as feedback and debriefing consist of various forms, the appliance should therefore be based on the specific context and situation, but not lose its alignment with the mastery learning goals and the learning objectives (Eppich et al., 2015).

### **Position in Previous Research**

There are several similarities in these studies that are both similar to each other and can be recognized as aspects in the theoretical models and strategies. Such aspects are, for instance, the concept of psychology safety that is based on trust and honesty, the fundamental role of learning objectives and expectations, the conditions of the learner, the leadership responsibilities and processes of the educator as well as essential components, such as interaction and reflections, in the debriefing process. Similarities across research studies can also be understood as dialectical to each other, where one concept synonymously is used as another concept (Dennehy et al., 1998). For instance, guided discussion aims to enhance reflections, whereas guided reflections processes through discussions (Cant & Cooper, 2011; Chronister & Brown, 2011, Dreifuerst, 2009; Fanning & Gaba, 2007; Gardner, 2013; Ledermann, 1992; Zigmont et al., 2011a; Zigmont et al., 2011b). In this case, the core components are guidance, discussions and reflections. Despite how the terms are organized in the descriptions, there are several aspects in these descriptions that are similar. Firstly, both descriptions have a common purpose and goal, which is reflections. Secondly, practical and abstract processes are integrated, which is, thirdly, formed by central relationship between human beings; the educator, the group and the learner and based on the practice and practical context of debriefing. In this respect, if one study lacks one quality in the description of the debriefing process but exists in another study, it does not necessarily mean that this specific quality has not been identified in the study. The quality can implicitly be understood or embedded in or as another quality (Dennehy et al., 1998; Fanning & Gaba, 2007). For example, one strategy's initial phase consist of several steps, such as identifying the impact of the experience, identifying and considering the processes which developed and clarifying facts, concepts and principles, and is described as the introduction to systematic reflection and analysis in another strategy and as the first stage, known as the events, where the learners are encouraged to share descriptions of the simulation-based experience, in an additional strategy (Fanning & Gaba, 2007, Ledermann, 1992; Mayville, 2007; Petranek, 1992).

Several researchers have made attempts in standardizing the debriefing process by merging empirical breakthroughs and theoretical findings. One attempt views and analyses the debriefing process from various perspectives, such as the roles in debriefing (who), the time of debriefing (when), the environment of debriefing (where) and the process of debriefing

(how) (Mayville, 2007; Raemer, 2011). Other attempts have formed and developed new models and/or strategies. The 3D-model is one example of models and/or strategies that has been developed this way (Zigmont et al., 2011a). Despite this, several researchers explain that a standardized debriefing process does not exist. Rather, debriefing is dynamic, depended on its present context and have a situational functioning (Cant & Cooper, 2011; Dufrene & Young, 2014, Fanning & Gaba, 2007).

Moreover, it is broadly understood among teaching researchers as well as researchers that the functioning of a debriefing session lies in the role of the educator (Boet et al., 2011, Crookall, 2015; Decker et al., Dufrene & Young, 2014; Fanning & Gaba, 2007; Ledermann, 1992; Petranek et al., 1992; Raemer et al., 2011). Standards of best practice, successful strategies and effective debriefing are central concepts in the research studies in which the educator have a responsibility in creating the structure and content of the debriefing process and, in turn, applying various of methods and strategies that maintains and moves the learning process towards the learning objectives (Crookall, 2015; Dreifuerst, 2009; Fanning & Gaba, 2007; Zigmont et al., 2011b). Several researchers have agreed on that it still is an unexplored field of study with gaps of knowledge that needs to be given attention to (Beaubien & Baker, 2003; Raemer et al., 2011; Reed, 2013). One gap is where in the simulation-based experience the significant gains occur and what knowledge have been gained in the simulation-based experience. In addition, there is neither an agreement on a standardized debriefing process nor a measurement or clarification of additional leadership styles that provides best practice learning (Dufrene & Young, 2013; Fanning & Gaba, 2007). Previous research has also not yet established the impacts of individual components (Shinnick et al., 2011). Nevertheless, many gaps are based on fundamental questions such as how to debrief, whom to debrief and what to debrief, that remain unanswered and needs to be explored and studied for further development (Dreifuerst, 2009). Due to the limited scope and time of conducting this study, all gaps have not been covered. Rather, this study focused on the post-simulation-based debriefing process in a specific educational area; maritime training, that has not yet been explored. Thus, the purpose of this study was to investigate post-simulation debriefing in maritime training.

## **Purpose and Research Questions**

The purpose of this study was to investigate post-simulation debriefing in maritime training. To this purpose, the scope has been divided into two focal areas: the process of post-simulation debriefing and the instructions of post-simulation debriefing. Subsequently, for

each focal area, three research questions were formulated. In regard to the process of post-simulation debriefing, the aim of the research questions was to identify the structural components of the debriefing process. In the matter of instructions in post-simulation debriefing, the aim was to understand how the subject was taught.

- I.** In relationship to the process of post-simulation debriefing, the following questions were formed.
  - a) How are the debriefing sessions structured?
  - b) What are the core components in the process of debriefing?
  - c) In what ways does the debriefing sessions deviate from the planned debriefing?
  
- II.** In relationship to the instructions in post-simulation debriefing, the following questions were formed:
  - a) How are instructions organized in the debriefing sessions?
  - b) How are the specific situations in the simulation-based scenarios linked to more general themes and principles?
  - c) In what ways does the instructor emphasize the problems and solutions in debriefing?

## Method

In this section, the chosen method of the study is presented. This section describes what methodological approach the study had, the chosen setting and data collection method, data selection, data management and data analysis methods as well as the study's position in research ethical principles.

### Methodological Approach

The research study had an inductive approach which means that collected empirical material contributes with theoretical outcomes (Atkinson & Delamont, 2010; Bella & Dicks, 2011). The empirical material used video as a research method, which have several similarities to the observational perspective. Video recordings captures the phenomena in the field and approaches it as a natural setting. It grasps the authenticity of activities in the natural setting with minimal controlled conditions from the researcher. Moreover, it provides a great amount of scope of data material, which enables passive participation through observation of the video-recorded data, increases the scope of interpretations, the accuracy of research quality and the reliability of capturing activities (Atkinson & Delamont, 2010; Erickson, 2006; Pink, 2007). The combination of an inductive approach, video as a research method and the similarities with the observational perspective enriches the understandings and opens new forms of thinking through self-reflections.

### The Setting and Data Collection Method

The chosen field of this research study is an educational environment that is a part of an institution for higher education in Gothenburg. This educational environment focuses on maritime training and uses Bridge Operations Simulators. These are high fidelity navigation simulators that reminds of real ships. The attached image illustrates one of these simulators in the educational environment.



**Figure 11** The Bridge Operations Simulators. This figure shows environment in which the simulation-based task or exercise takes place.



In this environment, students learn how to use tools, navigate and operate in various conditions. The empirical material for this study is a collection of data material that is based on a course called Seamanship C. In this course, debriefing takes place after the simulation-based task or exercise in a separate room in which this research study focuses on and is illustrated below. As shown, the room is structured in a way where the desk arrangement is similar to the letter “U” in the alphabet. In addition, the desks were directed towards the board that was covered by a projector screen. On this screen, the instructor ran a playback of the recorded and conducted simulation-based exercise or task in which the learners participated in. The desks were arranged accordingly to the physical structure of the simulations. This means that each simulator has a specific name which accordingly named each desk, such as; Ada, Beda, Cilla, Disa, and Elsa.

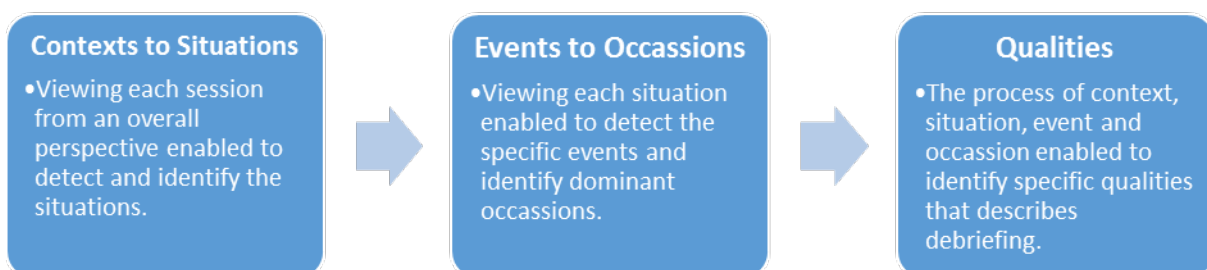


**Figure 12** The debriefing room. This figure presents the room in which the debriefing sessions takes place.

This research study is an extension of a previous research project and uses video as a research method and has primarily and approximately 60 hours of collected data from one go-pro camera in each of the five simulators, along with one audio recorder one camera in the instructors’ room and one in the debriefing-room. From this collected data, this research study focuses on approximately 16 hours, in total 47 video clips of collected data that takes place during the debriefing sessions. Each video sequence was between 2-12 minutes, involving two instructors at different occasions and between 5 to 10 participants every other round, which in total involved 10-20 participants.

## Data Selection, Data Management and Data Analysis Method

The strategy of data selection, data management and the data analysis method is based on the inductive approach of this study. The following illustration demonstrates the procedure of selecting and managing the data.



**Figure 13** Data Selection Process and Data Management Process. This figure shows how relevant data was selected and management.

Initially, each session is viewed with a focus on the corpus in its entirety. This enabled to detect and identify the relevant contexts. In turn, each context was progressively studied in order to detect and identify the relevant situations in which activities takes place. By further study the situations enabled to identify the specific events and dominant occasions in debriefing. In turn, the contexts, situations, events and occasions were organized structurally and repeatedly viewed. The purpose of this course of action was to capture relevance in the selected video segments accordingly with the research purpose, research questions and research objectives, which consequently became the basis for further analysis (Erickson, 2006; Heath, Hindmarsh & Luff, 2010).

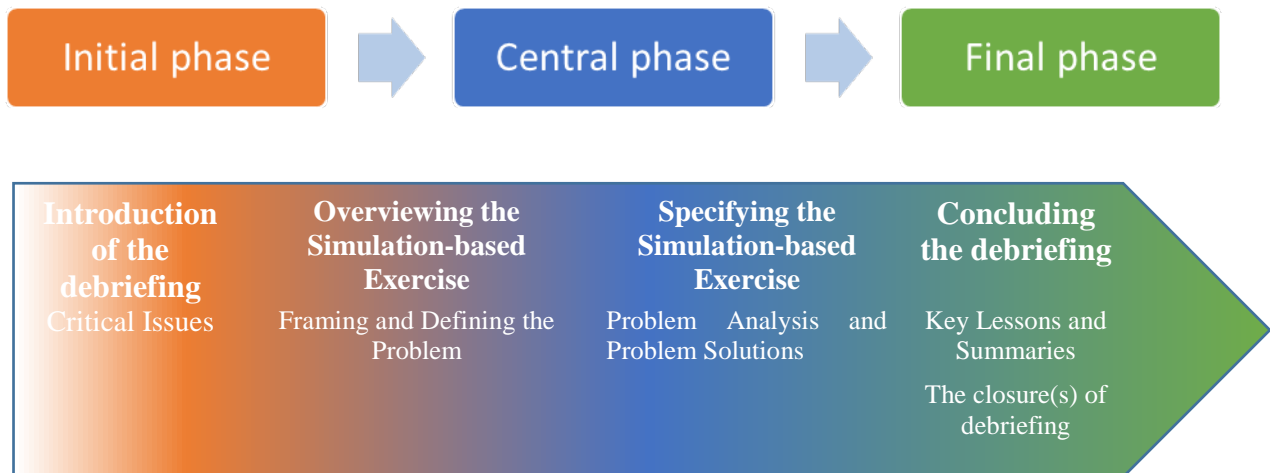
The data analysis method of the research study consists of three interrelated steps. First, the progressive procedure of the data selection and the data management marks dominant events and specific occasions within the video segments that relevantly are related to the research purpose, research questions and research objectives. Second, these dominant events and specific occasions include video as well as audio, which in turn are transcribed to a structural map of written text. Third, transcripts allow further detection, coding, interpretation and creation of the representations. The end goal of this structural map of written text was to identify and analyse the patterns of the representations of the post-simulation-based debriefing sessions (Erickson, 2006; Heath, Hindmarsh & Luff, 2010; Pink, 2007).

## **Position in Research Ethical Principles**

The research ethical principles are formulated by the Swedish Research Council (2010) and involves several requirements; the information requirement, the approval requirement, the confidentiality requirement and the requirement of usage. In this regard, all participants were informed about the purpose and content of the research, their rights to voluntarily participate, and at any time cancel their participation. Moreover, all participants decided themselves that they wanted to remain anonymous. Therefore, anonymity, confidentiality and data protection for privacy was, is and will still be respected. In conjunction to this, unscientific objectives, information and data publishing for commercial purposes are not relevant. The information and data that has been adapted for this study will not be used for other research purposes than the one already informed. In the respect of the ethical principles, the professional responsibilities and approaches of this study respects, protects and preserves integrity, confidentiality and both the requested and required involvement of personal, professional and public influences. In addition, the visual representations of the data material in the results of this study are intentionally manipulated. This means that the participants are, to a specific extent, blurred out in order to prevent recognition, identification and to protect the participants' integrity and right to remain anonymous. As the research study is an extension of a previous research project, the Ethics Committees have reviewed and approved the research's position in research ethical principles.

## Results

In maritime training, post-simulation debriefing was conducted after a simulation-based exercise or task. While analysing the empirical material, this study found that the structure of debriefing can be viewed from an overall perspective, which consisted of three phases: an initial phase, a central phase and a final phase. In turn, these phases are further specified, and consist of several key steps that form the process of debriefing.



**Figure 14** The structure of debriefing. This image shows that the debriefing sessions can be viewed from an overall perspective, consisting of three phases: an initial phase, a central phase and a final phase. In turn, these phases consist of several key steps that form the process of debriefing.

The initial phase of the debriefing session consists of an introduction of the debriefing. During this stage, the debriefing session started with a digital presentation of a list with questions. These questions highlighted both learning objectives of the simulation-based exercise as well as specific rules that described necessary and desired traffic behaviour. They encouraged a discussion, in which the students shared their reflections and emotions regarding their experiences and performed actions in the simulation-based exercise. Thus, these questions were asked, one by one from the instructor to the students, in order to capture the various perceptions in the given answers.

Subsequently, the central phase began as the digital recording of the simulation-based exercise was played on the projector screen. This was a way of recreating the simulation-based exercise. First, simulation-based exercise was virtually overviewed, which means that problematic actions and interactions were framed and defined. Thereafter, the simulation-based exercise was specified, where the framed and defined problems were systematically reviewed. During this review, the performed actions and interactions were evaluated and assessed by the students as well as the instructor. Additionally, alternative solutions for the specific problems were discussed and selected.

During the final phase, the key lessons were knit together. The key lessons reflected the key learning points from the actions and interactions that were reviewed and analysed during the central phase. These were related to the learning objectives and rules presented during the initial phase. Critical conclusions, for example in terms of practical solutions, were also raised again. From an overall perspective, the simulation-based exercise was summarized and finalized.

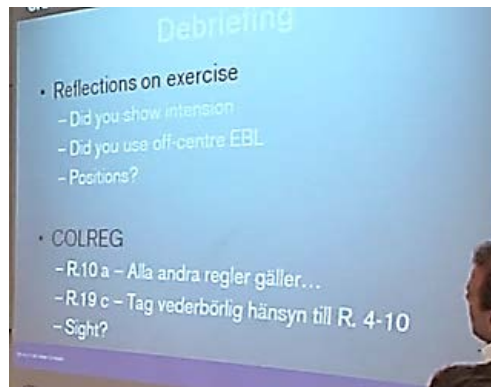
As earlier mentioned, the overall structure, that consists of three main phases, can be broken down into several key steps. Each step in the structure consists of examples of recurring events followed by descriptions. The primary reason for this is to provide a thorough understanding of the process in its entirety.

## Initial Phase

In this phase, the introduction of debriefing began. The following section consists of prominent examples and descriptions of the beginning of the debriefing session.

### Introduction of the debriefing session

The beginning of the debriefing session started in various ways and was based on the nature of the performed actions and interactions in the simulation-based exercise. Generally, and as presented in figure 15, the debriefing started with a digital presentation of a list with questions and rules.



**Figure 15** Reflections on exercise. This figure shows a digital presentation with questions and rules that guided the discussion the performed actions and simulation-based exercise.

As presented in figure 15, 'Reflections on exercise' consists of questions that were related to the learning objectives of the simulation-based exercise. In the same example, 'COLREG' include specific rules that described necessary and desired traffic behaviour. These questions and rules were used as guidelines during and for the discussions. They encouraged the students to share their reflections and emotions regarding their experiences and performed actions in the simulation-based exercise. They were also used as guidelines for the feedback the instructor provided. Based on the structure of the list, the instructor went through the questions and rules one by one, where the students are encouraged to answer and/or discuss them.

The following example (EXCERPT 1) demonstrates how the debriefing session generally started. In this example, the instructor asks the students if the intentions of their actions were clear enough for the other ships in the same scenario to understand. Showing intentions was a recurring rule that was emphasized during the debriefing sessions and was an action of safety-sustainable traffic behaviour.

#### EXCERPT 1

Instructor: Debriefing [...] The reflections [...] Did you show your intentions?  
Student: Yes.  
Instructor: Someone who didn't?  
Student: [Raises hand]  
Instructor: Elsa feels she didn't. Cilla?  
Student: Najee [...]  
Instructor: Depending on what intention you wanted to show. You always want to show some intention. They might be wrong however. Eh, did you use the off-center EBL?

Student: Worked good.

AS EXCERPT 1 demonstrates, similarly to what figure 15 shows, the questions reflected the learning objectives. The learning objective in question was the level of obviousness in their intentions. By asking these questions indicated that the instructor wanted to clarify how the students understood the rules and how they acted according to the rules. In the following example, the instructor asked each team or ship how they experienced the simulation-based exercise.

#### EXCERPT 2

Instructor: Yes. How did it go? How did it feel? Elsa?  
Student 1: Good.  
Instructor: It felt good. Alright. Ada?  
Student 2: It went well [...] in the end.  
Instructor: In the end [...] We backed up on shallow water and then we drove away from it. That felt good.  
Student 2: It is not going to be cheap to pay for the boat, but [...]  
Instructor: Alright. Disa? Any good feeling?  
Student 3: Eh [...] Really bad actually.  
Instructor: Alright. Cilla?  
Student 4: Good.

In this example, open questions were asked and consequently started a reflective discussion. Despite the fact that a reflective discussion enabled students to understand other students' experiences of the performances, the instructor received information. By asking how the students experienced the simulation-based exercise provided information about their own assessment of their own actions in relation to the rules. The instructor identified their understandings, as these were problematized, analysed and solved in the next phase.

Despite the fact that the general introduction stage enabled a discussion in which the students can describe their performed actions of the simulation-based exercise, the instructor did not extend it to a longer discussion. Rather, the instructor was seeking whether or whether not different types of perceptions; both understandings and misconceptions; in relationship to the rules existed. One example of such interaction is demonstrated below.

#### EXCERPT 3

Instructor: Did you show your intentions?  
Student 1: Nae [...]  
Student 2: Mmm? [...]  
Instructor: I would say that it was alright with the intentions.  
Student 3: Aouch [...]  
Instructor: Maybe it did not do that much, because you did not have anyone close, but none of you drove close to the center line. You from the north side probably did it. But nobody else did it. We will take a look at this.  
Student 4: We did it, but then we had the huge separation zone before we reached the centre buoy, to think about.  
Instructor: Okay [...] I saw several people who did and no [...] We will take a look at it later.

This example began with a general question: 'Did you show your intentions?' and ended with: 'We will take a look at this.'. It demonstrates that the debriefing session started as planned, with an open question reflecting the learning objective. In turn, the answers that were given were indications of doubts and errant actions such as: 'Nae [...]', 'Mmm? [...]' and 'Aouch [...]'. Subsequently, the instructor gives brief explanations/answers and ends with an indication of that these doubts and errant actions further would be reviewed, analysed and solved.

### **Critical Issues**

In several occasions, the instructor used another method in the introduction stage in the debriefing process. In this case, the instructor immediately provided feedback about one team's performance in which he identified as critical to learn. The following example demonstrates how direct feedback was given during issues that were critical:

#### EXCERPT 4

Instructor: Cilla goes out and takes the dot on the side. Was it intentionally?  
Student: No.  
Instructor: No. Otherwise it is that kind of dot that is taken on the other side. Now, it was certainly, eh, enough water today to drive on the wrong side, but otherwise, it would be good to keep track on those.

In this example, the immediate character can be recognized in where the instructor defines one's team performance and subsequently questions it: 'Cilla goes out and takes the dot on the side. Was it intentionally?'. Followed by the given answer from the student, the instructor indicates that it 'would be good to keep track on those'. What differ this method from the previous methods; such as EXCERPT 2, EXCERPT 3 and EXCERPT 4 is the general character of introduction compared to the specific character of introduction. The previous methods enabled open discussions which is a process of gaining insights, whereas immediate feedback provides information about how principles in practice operate and should operate directly. In conjunction to this, the following example is another representation of how direct feedback is given.

#### EXCERPT 5

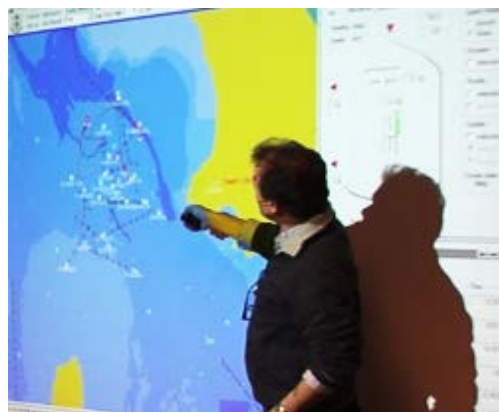
Instructor: Generally, sometimes when I look at your screens, and see that you have long trails and pretty long vectors, I mean, I have been in the sea for thirty years, and I cannot sometimes see what the screen is picturing so I would recommend to have less of that sometimes. I sometimes use these trails in the sea to see if somebody moves or not, just to get an indication: 'Oh, it goes to the south.' That's it. Until you get a plot of it, but if it becomes too much [...] Just think about it for next time.

The initial phrase: 'Generally, sometimes' demonstrates how the instructor indicates that the general consist of the specific and that the specific affects the general. This is in turn followed by a recommendation based on personal experiences, where the instructor gives example on how to use a specific screen in specific situations and how to understand the information it is giving. This is also an example of how a theoretical principle is applied to a practical context, where the use, the conditions and the interpretation of the principle shapes specific traffic behaviour.

## Central Phase

After the initial phase, the central phase began. During this phase, the simulation-based exercise was digitally recreated. First, the students and the instructor overviewed the simulation-based exercise, where specific problems were framed and defined. In turn, the simulation-based exercise was specified where the framed and defined problems were reviewed and analysed. In the following section, these steps are further presented and includes both examples and descriptions.

After the introduction of the debriefing, the instructor ran a digital playback of the recorded simulation-based exercise. The following image demonstrates the recreation of the exercise.



**Figure 16** Task-orientation. This image shows how problems were highlighted during the playback.

While viewing the playback of the simulation-based task, particular attention was given to the problems. Throughout the debriefing process, these problems were managed in different ways. The main procedures were to describe the problems, frame and define them, review and analyse them as well as evaluate, assess and solve them. Figure 16 illustrates how the simulation-based task was viewed, overviewed and specified.

## Overviewing the simulation-based exercise



**Figure 17** Overviewing the simulation-based exercise. This image shows that the interactions between the involved ships are being viewed from an overall perspective.

In the debriefing session, the simulation-based exercise was recreated through a digital playback. This playback was a result of a recording of behavioural, operating and technical interactions, situations, events and actions. What figure 17 shows are movements of the ships involved in the simulation-based exercise. As these ships moved, the instructor and the students viewed the interactions and described situations, events and actions. By viewing and describing the simulation-based exercise was to give and get a general understanding of the exercise. Thus, overviewing the simulation-based exercise was to form an overall picture of the performed actions and interactions. One example that describes how the background of the simulation-based exercise was given is demonstrated as follows:

EXCERPT 6

Instructor: The scenario looked like this in the beginning. Up here is the Strait of Dover. Down here is the Azores somewhere. Down here we have Gibraltar and on the other side we have Newfoundland, just to have an overview of where we are. So where are we?  
 Student: In the Atlantic Ocean.  
 Instructor: Yes. In the Atlantic Ocean [...] Everybody have the same scenario. Everybody have somebody who passed them fast. Implementation, contribution and constellation.

In this example, the instructor gives a background about the geographical location of the ships, followed by a brief explanation about the students' same conditions during the simulation-based exercise. In turn, this is followed by three principles; 'Implementation, contribution and constellation'. These were indicated as central principles that would further be investigated and analysed, set in practical context.



**Figure 18** Laser pen and movements. This image shows how the instructor highlights a specific movement of a ship as a method of emphasizing a specific action and rule.

As the instructor gives the background about the geographical location of the ships, a laser pen is used to highlight the directions in the interaction. This case shows how Elsa was on her way to Newfoundland, Canada. This way of overviewing the simulation-based exercise; viewing and describing it, consequently led to framing and defining the problem.

**Framing and Defining the Problem**

The process of overview of the simulation-based exercise began with firstly, framing and secondly, defining the problem. The following example is a representative demonstration of how the problems were framed.



## EXCERPT 7

Instructor: Beda, you see how this goes out, what do you do?  
Student: We increased the speed of our ship.  
Instructor: Increased the speed [...] Good. What is the natural step after this?  
Student: We turned around.  
Instructor: Yes, good. But after this? What do you do then?  
Student: Then it becomes more complicated.  
Instructor: Yes, because it's not just one ship, it's two. So the question is: what is the distance between this ship and the other ship? If we had full speed, could we drive between them that has a buoy cross that is at, at least two, just like we said.  
Student: That is possible.  
Instructor: Yes, it is actually. Increasing the speed, there is nothing wrong with that, but it can become risky too. And that is the problem. Even though you had full speed, you might not have managed to drive between them in time.

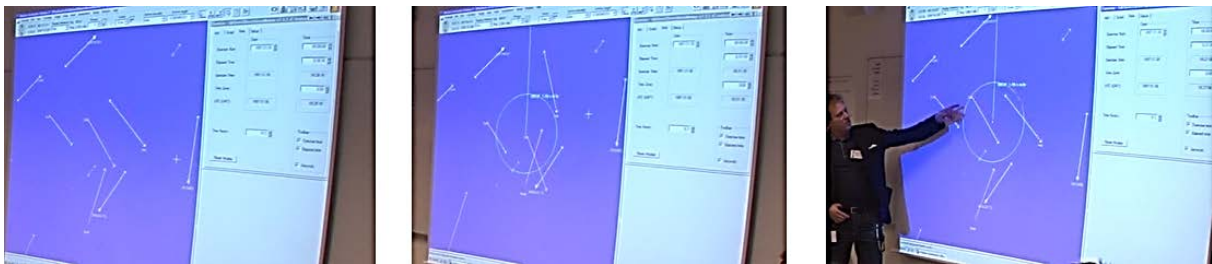
In this case, the main action and/or main event were viewed and highlighted. This way, the main action and/or main event was a problem that was framed and defined, and in turn, questioned and problematized. From the example, the main action and/or main event was when the speed of the ship increased and in turn, involved in a more complicated situation. By framing this problem, and subsequently, this general phase was further broken down into a more detailed and specific review of the scenario. In this case, the following question: 'What is the natural step after this?' was an initial initiative to switch between the general view and what is specific. The actual transition between the general overview of the scenario to a further specified review of the scenario was when the guided question: 'But after this? What do you do then?' was answered by student and elaborated by the instructor. The final explanation by the instructor was a summary of how risky traffic behaviour becomes when the speed of the ship increased. By framing and defining the problem, theoretical rules are explicated through the potential consequences of a specific risky traffic behaviour in a practical context. During this specified review, the playback of the simulation-based scenario was paused in order to highlight the interaction in which the problem was occurring.



**Figure 19** Highlighting with a laser pen. This image shows how the instructor highlights the specific action and/or event described in Excerpt 7.

Figure 19 demonstrates how the instructor highlighted, with a laser pen, the interaction, events and actions that were presented in EXCERPT 7. Subsequently, the instructor used rhetorical questions and provided 'if'-scenarios or hypothetical scenarios. These 'if'-scenarios was recurring in the empirical material. These were related to the specific event that was crucial in the scenario. By providing 'if'-scenarios, and as presented in the example, was a way of contrasting or comparing correct and incorrect actions necessary to take or to avoid. In this case, it was used as a method of framing the problem, which the learners' responded to. Subsequently, the instructor confirmed the students' response, explained the consequences of the actions and emphasized the rule of action.

## Specifying the simulation-based scenarios



**Figure 20** Pause and zoom. This image shows that the specific scenario is being paused and zoomed in as a way of highlighting the specific action in the interaction.

While playback ran, the instructor pauses it and specifies the simulation-based scenario. In other words, the playback was zoomed in, in a way that captured the movements of the involved ships. As the playback was paused and zoomed in, these were reviewed, evaluated and assessed. In this case, the problem solution process began here the instructor and the students frames and defines the problem, analyses the problem, review and evaluate alternative solution and assess the selected solution. This process is further presented in the next section.

## Problem Analysis and Problem Solutions

As the problem was framed and defined, the problem *per se* is further specified through a problem analysis. What was found in the empirical material was the majority of the problem analysis started with a guided discussion followed by instructional guidance. The following example is a representative demonstration of such problem analysis. In this case, the instructor guides the students to understand the problem and the solution to the problem. The discussion was about how one can discover whether or whether no other ships have radar.

### EXCERPT 8

Instructor: What is required in the fog to clear up this situation?  
 Student 1: Radar.  
 Instructor: Radar. Who in this scenario have radar?  
 Student 1: Everybody.  
 Instructor: Everybody? How do we know that?  
 Student 1: I don't know.  
 Instructor: Exactly. We don't know. But if you are in Ada with radar and read from its primary scenario [shows on the screen] How can we say that someone has radar?  
 Student 2: If they turn, when there is a fog.  
 Instructor: Yes. If you see that somebody is turning, then you say that the person has radar. And then you can ask: is

there a probability that a ship that drives this fast  
have radar?

Student 3: Yes.

As in the majority of the empirical material, the problem analysis started with and consisted of rhetorical questions, which was a common method that enabled discussions in which the students shared their reflections and experiences. These responses were, in turn, used to guide the learner through their actions and performance. The transition between what is noted as a discussion of general character to a more specific review of the scenario can be recognized in the phrase that starts with 'But if you are in Ada [...]'. Additionally, the guidance was also recognized in the provided 'if'-scenarios, which in this case was followed by an explanation 'then you can say that the person has radar [...]', followed by an indication of reasoning behind that action 'and then you can ask: is there a probability [...]'. Using 'if'-scenarios was a method of providing alternative consequences that could occur after a specific performed action. By emphasizing the alternative consequences of a specific performed action were instructions that guided the students towards a specific understanding. These instructions were direct explanations of what reasoning is expected and necessary to conduct while being involved in a specific traffic interaction.

Furthermore, and in the same case, theoretical principles, put in a practical context, were explained and clarified by the instructor.

#### EXCERPT 9

Instructor: Yes. That is the probability. Is it possible that there are incompetent drivers on-board?

Student 1: No.

Instructor: No. But is it still possible?

Student 1: Yes.

Instructor: Yes. There is a probability of incompetent drivers or competent drivers that are lost and you need to avoid these things. So some kind of probability calculation. But then you have radar so you hold the truth and therefore, there is a great responsibility on big ships that have radar. And here it is important with the intentions. To show you intentions. If he has radar, then he should understand your intentions. That is the whole point. Therefore, you need to show it. If he has radar, then he should also see it. If he does not have any radar, then he drives too fast according to COLREG. You cannot do anything about it, but you have radar and therefore you are responsible to manage the situation. Are you with the ball game?

Student 1: Yes.

In this case, the instructor highlights the consequences of and the possibilities in the scenario which clarified the conditions of the events in the scenario. By understanding the conditions of the events indicates what necessary, professional approach and performance the specific scenario requires. This example highlights how direct instructions are provided to the learners and begins with relating the conditions to the theoretical principles: And here it is important with the intentions. To show your intentions. This was also a way of indicating the expectations of performed actions and the reasoning behind the performed actions. By understanding the various conditions of the scenarios, instructional guidance reinforced the understandings of the necessary and professional approach and performance. In EXCERPT 9, instructional guidance put and explained theoretical principles in the practical context in order to display the correct reasoning of the correct performed action.

In several video segments of the empirical data material, the discussions were extended in which the instructor repeated the key points. The following demonstration is an example of such interaction. In this example, the students explain their role in a specific interaction where several ships were involved in a complex situation. This situation included rules, such as giving way, awareness of the speed and driving directions. As the students explain their reasoning behind their performed actions, the instructor explains the consequences of their reasoning.

EXCERPT 10

Instructor: Did you lower the speed here?

Student 1: Yes, we lowered the speed for both situations.

Instructor: Yes, but hold on, wait a minute. Because this is what is interesting, I mean, to discuss those. Because if you think so and then you on that: 'Yeah, pull on the port side here, Beda [...] and then you tell Cilla that you think it is okay for Beda to turn here, and then Cilla turns between Beda and the bulk carrier [...] And then you keep track of it, that everybody agrees on it? Are you with me and what I mean?

Student 2: But it never goes so far. Because if Beda turns then Cilla will [...] [Team member interrupts]

Student 1: Let me explain. I mean [...] We positioned ourselves there in the beginning, in order to give her [...] Partly, we lowered the speed, 11 knots 12. Then she had the chance to get a good bowcross to us and to the port side, but also turn early on the buoy, because we drove also so that helped. She had both opportunities [...] Where is it okay? Now it's four cables, if we had met starboard-starboard. I would have never misunderstood the four cables, like if I would start doing like this [shows directions with hands] when it is a crossing situation. So for me, it would be completely okay if she pulled the buoy, I think. Without involving anybody else.

Instructor: Yes, I understand, but no. Because the thing is that Cilla have a duty to give way to her and her [points on two ships on the screen]. So if you think that and then talk to her can still entangle it for the rest in the scenario [...]

Student 1: Yes. Okay. Absolutely.

As mentioned, this example demonstrates how the problem analysis is further conducted where the discussions were extended and instructional repetition implemented. This example began with the instructor confirming the students' answer and repeating the key points earlier framed.

The instructors' repetition was elaborated by highlighting the conditions of the interaction, where the consequences of the reasoning behind the action of the student were framed. In turn, the students share their reflections about their experiences from the simulation-based task. More specifically, they explain their reasoning behind, as well as their doubts in regard to their performed actions. The instructors listened to the descriptions from the learner and identifies the misconceptions, which were used as a basis for re-explaining and clarifying the professional reasoning, approach and actions necessary in that specific scenario. A brief answer was portrayed as a direct instruction to the student and another indication of re-teaching the key points.

Extended discussions and instructional repetition occurred frequently in the empirical material. It was a recurring phenomenon that reflected how generalizations were made. Gaps of understandings or knowledge were filled with further guidance of the problem towards the solution. This guidance consisted of instructions in which key points were given to the student. By providing them repeatedly, was a method of pointing to the professional approach necessary to master in the specific, practical context.

Throughout the debriefing process, rules had a significant role and were frequently emphasized. These rules were portrayed in different ways and can be recognized as theoretical principles, practical rules, key lessons, summaries, purposes and goals. Rules reflect a desired and/or necessary traffic behaviour for preventing risks and implement a safety-sustainable behaviour. The following example demonstrates how the rule of giving way to ships and practical traffic contexts were related together.

#### EXCERPT 11

Instructor: Here we have a tight passage distance. Can we do anything about it?  
Student 1: There is little room for that.  
Instructor: Yes. Here comes a ship and here comes Ada and now we have an incident. According to the rules, who has to give way to who?  
Student 2: The one from the south.  
Instructor: That is correct. If we look at the positions, do we have any point of views regarding this?  
Student 1: It is too tight.

In EXCERPT 11, a guided discussion in which the instructor asks guided questions that are linked to the specific rule. The learners provide responses based on their reflections and knowledge of practical performance. This discussion guided the learners to conclusions about the interactions in the scenario and their own performed actions. More specifically, an incident occurred in the scenario. The reason for this was that the rule of giving way to a specific ship was not applied when it was necessary. This exemplifies how rules were put in simulation-based contexts as a method of increasing understandings about professional reasoning and performance. Another example that demonstrates how rules acted in practice is as follows:

#### EXCERPT 12

Instructor: [...] The trial should show crossing points. That is the whole point with rule number ten. To drive sideways and

be behind the ship is not that hard. Rather, it is the crossing points that are a bit tricky. Therefore, you could have been driving a bit further and then cross it in order to come to the primary point.

Compared to EXCERPT 11, EXCERPT 12 demonstrates immediate or direct feedback that is characterized by instructional guidance. This means that the instructor describes stepwise the interaction in the scenario and the professional action that was necessary in that specific scenario. More specifically, the instructor explains the purpose of 'rule number ten' and how it can be understood in specific practical contexts. Both EXCERPT 11 and EXCERPT 12, however, put specific rules in practical contexts where the professional performance is questioned and/or explained and clarified.

In the following section, finding alternative actions as solutions were provided through guided discussions or directly from the instructor. The following demonstration is an example that represents how questions were used as a method – in guided discussion - specifically for reviewing and evaluating alternative actions as solutions.

#### EXCERPT 13

Instructor: Those of you who were not involved in Disa, what do you think you should do in this situation?

Student 1: Go behind the starboard-ship that is closest and then drive up like that.

Instructor: Okay. Does it feel like a good solution? What does the rest think about this?

Student 2: It's a little too close maybe.

Student 3: Well, you can turn around 90 degrees if you want to drive the ship to [...]

Student 4: Nae [...]

Instructor: What are the options?

Student 5: Decrease the speed.

Instructor: What is more obvious? What have we said? Which one comes first?

Student 5: Well, you can turn, perhaps not 90 degrees, but 30 degrees and then decrease the speed.

Instructor: Which one is more obvious?

Student 5: To turn.

Instructor: Yes. To turn. Good.

In this case, the problem was already framed and defined. As the students reviewed and evaluated the problem in the interaction, the discussion focused on finding the solution to the problem. The discussion was guided by the instructor through questions where the given answers from the students consisted of various of alternative actions as solutions. In these occasions, the learners reflect on their own and the others' performance, share their ideas as well as provide alternative actions as solutions. The instructor confirmed the students' responses as way of verifying that the provided answers consisted of correct or incorrect understandings. This was also a method of generalizing knowledge. Guiding through rules, practical principles and asking rhetorical questions were used as a tool for guiding the students towards the solution or correct answer.

The following example is another demonstration of how alternative actions as solutions appeared. In this example, the instructor provides direct feedback on a problematic action followed by an explanation on which rule to apply in this scenario. As the rule is applied, the instructor explains how to manage the practical situation and the reasoning behind the solution.

EXCERPT 14

Instructor: Your primary problem is here, where you have to give way to the others. And somehow it needs to be done. So the solutions are either to turn or decrease the speed. So which one to you want to do? Well, in this case you want to turn. Do we have any room for the turn? Yes, we do. Infinite? No, we do an overtaking. Can we see it? Yes, we have an eye on it on the radar. Oh, okay. Is there a probability that a ship that drives this fast have radar and control of the situation?

Student: Yes.

Occasions similarly to this example is recurring in the empirical material. Compared to EXCERPT 13 where the students discussed their way through the problem in order to find the solution, EXCERPT 14 demonstrates how the problem, the reasoning behind dealing with the problem and striving towards the solutions is primarily provided by the instructor. During the discussions, the students described their performed actions and their reasoning behind these actions. The instructor, in turn, have identified misconceptions, misunderstandings or gaps of knowledge. Thus, during these occasions, the instructor re-explains the key points in the guided discussion in a way that is similar to a self-dialogue in which the reasoning behind each alternative action as solutions are emphasized. This was understood as instructional guidance, where the instructor knew the answers in advance, asked the students rhetorical questions and guided the learners' through their reflections with instructions. Also, this was a direct approach in which theoretical principles embedded in practical performance were straightforward and clear in its guidance.

In the previous example, EXCERPT 9 the instructor confirms, (re-) explains and clarifies the selected solution for the specific problematic scenario. Another example of how the selected solutions were confirmed and clarified is demonstrated as follows:

EXCERPT 15

Student: [...] But we should not take it for granted.

Instructor: Exactly. But this is the case. Elsa has radar. They have full control of the traffic. So the primary goal is to show to him that we have turn, that we have seen him. If he does not have any radar, then he does not know that you can solve the situation. Same thing here, if he does not see you, then you have to solve the problem, because you have radar and those are the rules. That you solve the problem and show your intentions clearly.

In both examples, the selected solution of the specific problematic scenario highlights what kind of professional actions and performances that were necessary, and reasoning behind them, the specific interaction and/or scenario required, as well as how they should operate in similar and recurring interactions and/or scenarios. The examples also demonstrated that there was a direct approach in the instructional guidance. This means that theoretical principles embedded in practical performance were straightforward and clear in its guidance.

As previously presented (EXCERPT 9 and EXCERPT 15), confirming and clarifying the selected solutions of the problems in a specific scenario was another way of generalizing. In these cases, guided discussions enabled the learners to reflect on alternative actions as alternative solutions. These were analysed by the instructor, who identified misconceptions, misunderstandings or gaps of knowledge, which led to instructional guidance. In the role of solutions, instructional guidance consisted a description of reasoning behind each alternative action as a solution. Subsequently, the instructional guidance provided a solution that was confirmed, explained and clarifying by the instructor. Thus, the knowledge and skills in the selected solution were generalized and characterized necessary, professional actions, performance as well as the reasoning behind them.

## **Final phase**

In this section, the final phase is described. This phase presents and describes several key steps, such as key lessons and summaries, the closure(s) of debriefing and emphasizing the purpose(s) and goal(s). From an overall perspective, the final phase summarizes and finalizes the debriefing session.

## **Key Lessons and Summaries**

As presented in EXCERPT 9 and EXCERPT 15 in the earlier section, confirming and clarifying the selected solutions of the problems in a specific scenario was one way of generalizing. In these cases, instructional guidance in the discussions enabled the learners to reflect on alternative actions as solutions. The discussions were analysed by the instructor, who identified misconceptions, misunderstandings or gaps of knowledge, who in turn provided instructions as guidance. In the role of solutions, instructional guidance consisted a description of reasoning behind each alternative action as a solution. Subsequently, the instructional guidance provided a solution that was confirmed, explained and clarified by the instructor.

The following example demonstrates how key lessons were summarized and in turn, finalized the debriefing session.

EXCERPT 16

Instructor: [...] So a little bit more proactive. Try to read what will happen and so: 'Well, if we do this like that, we do not have to run into this situation or we get more room in this situation'. We'll take this with us. Above all else [...] Any questions or comments? Alright. Let's continue.

In this case, the key learning points were raised again as a conclusion of the session. The final question 'Any questions or comments?' was a way of asking for assurance. The given answer, which in this case was nonverbal, confirmed that the key learning points have been taken and that the lesson could continue. The following demonstration is another example that represents how key lessons were summarized.

EXCERPT 17

Instructor: [...] Disa can turn around down here. Very well done and a good dialogue from Disa's side, to turn around down here, on the other side of the buoy and to let the other ship pass, without getting into a conflict with



these ships and these ships. Good thoughts. Elsa on the other hand missed the positioning, but that is a lesson. Everybody else should also take this as a lesson. Make sure that the line is in the right place and be careful with that. Always good with examples we can learn from.

During the debriefing sessions, the key lessons – portrayed as theoretical principles as well as practical actions and skills, were diligently processed through guided discussions and progressively given by the instructor. This case, along with several similar occasions in the empirical data material, took place in the end of the debriefing sessions. Whereas EXCERPT 16 summarized and emphasized the necessary action as a key lesson, EXCERPT 17 had key lessons that were integrated in the given examples. Despite the different characters of summaries, both examples as well as the majority of the final phases during the debriefing sessions compiled and formed theoretical principles and practical actions and skills to a summary that consisted of these key lessons as knit together.

### **The Closure(s) of Debriefing**

The final step of the debriefing process was also closure. In EXCERPT 16, for example, key lessons or key learning points were knit together and summarized. At times, the next step in terms of homework, test or lesson was presented. Hence, information that was identified and defined as crucial were, in a repetitive and/or conclusive way of closing the debriefing session. As previously presented, the instructor provided conclusions drawn from the theoretical principles and practical performance combined directly. In turn, the instructor ensured that the knowledge have gained by asking the students if they have any other reflections regarding the simulation-task, homework, test or the course in general. Similarly, the students were also invited to share their conclusions as a way of confirming that knowledge has been gained. And if they had any reflections that highlighted gaps of knowledge and/or misconceptions, they were encouraged to share these in order to fill them and/or adjust them. The closure of debriefing was therefore a two-way stream between the instructor and the students, where the dialogue was a final step in ensuring that the knowledge in question was gained.

### **Emphasizing the Purpose(s) with and Goal(s) in Debriefing**

The purpose of debriefing was explicitly explained by the instructions who emphasized the reasons of debriefing in several occasions in the debriefing sessions. Such key phrases are for example:

EXCERPT 18

Instructor: As long as we can learn the good and the less good [...] We are not going to learn the less good. Rather, we are going to learn from it, so that we will be better.

EXCERPT 19

Instructor: We have some small things to learn from but we should also bring the good things with us.

Both EXCERPT 18 and EXCERPT 19 indicate that the purpose of debriefing is to keep the strengths sustained and the weaknesses improved and more importantly, that the debriefing is a learning session for the learners' learning and development.

Furthermore, the following examples are key phrases that highlights the goals of debriefing.

EXCERPT 20

Instructor: It's all about doing things in good time by having foresight.

EXCERPT 21

Instructor: It doesn't always turn out the way you want things to be  
Because somebody may do something crazy, but it is about predicting it [...]

EXCERPT 22

Instructor: We don't work with luck here. It is all about the right skills. Good seamanship like you say [...]

EXCERPT 23

Instructor: You need to understand the interaction so that you can make the right decisions and do what you must do.

EXCERPT 24

Instructor: You need to avoid these things [...] To solve things in good time so that it won't be this exciting [...] Good driving is uneventful.

EXCERPT 25

Instructor: Showing your intentions [...] It is important to read and understand the traffic (.)

Each EXCERPT of EXCERPT 20-25 presents how the instructor clarified and provided information about the goals with the debriefing. First, both EXCERPT 20 and EXCERPT 21 indicate the aim of debriefing is to implement a preventive behaviour, where EXCERPT 24 indicates 'avoiding things' and 'good driving is uneventful' a safety-sustainable behaviour. Furthermore, 'understand the interaction' in EXCERPT 23 and 'important to read and understand the traffic' in EXCERPT 16 indicates the significance of risk- and situational awareness. Also, 'right skills' in EXCERPT 22 and 'right decisions' in EXCERPT 23 indicates skills in decision-makings and action-takings that are characterized by judgmental accuracy.

The purposes and the goals of debriefing in the debriefing sessions reflected the reasons and the goals of learning theoretical principles and developing practical performance. Whereas the purposes of debriefing emphasized the reasons of why the debriefing sessions were necessary to have, the goals of debriefing reflected the desired behaviour, skills, abilities and reasoning of the professional performance. Apart from the characteristic difference between the purposes and the goals, the frequency of their occurrence were also difference. The number of occasions in which the purposes of debriefing were emphasized were fewer than the goals of debriefing. Apart from being several more, and as demonstrated, these were also portrayed in various ways in the debriefing session.

Despite this, both the purposes and the goals of debriefing acted as generalizations. This means that they were indicated as key points of a specific event or action. These key points occurred in the debriefing process as partial or final closures. While the partial closures occurred regularly during the debriefing session, the final closures occurred as an end in the debriefing session.

## **Discussion**

The purpose of this study was to investigate post-simulation debriefing in maritime training. To this purpose, two focal areas were chosen: firstly, the process of post-simulation debriefing and secondly, instructions in post-simulation debriefing. As for the process of post-simulation debriefing, the aim was to identify the structural components of the debriefing process. Additionally, in regard to instructions in post-simulation debriefing, the aim was to understand how the subject was taught. This section is divided according to the structure of the focal areas. In each focal area, and based on its research questions, findings of the study are discussed in conjunction to previous research.

### **The Process of Post-Simulation Debriefing**

This study found that post-simulation debriefing in maritime training was designed to be systematically conducted. In this matter, the structure of the debriefing process involved an overall structure that was composed of an initial phase, a central phase and a final phase. Each phase in turn consisted of several key steps that formed the debriefing process. These key steps included the introduction of the debriefing session, overviewing the simulation-based exercise, framing and defining the problem, specifying the simulation-based scenarios, problem analysis and problem solutions, key lessons and summaries, the closures of debriefing and finally, the purposes with and goals in debriefing.

First, the initial phase consisted of an introduction of the debriefing. In this stage, a list of questions, that reflected both learning objectives as well as traffic rules, was presented. The questions were used as guidance to the discussion, enabled active participation in the discussion and encouraged the students to share their reflections and experiences regarding their performed actions in the simulation-based exercise. This way, the instructor could capture the various perceptions in the given answers.

In conjunction to this, several researchers have presented similar contents that take place in the beginning of the debriefing. For instance, the initial phase and/or introduction of the debriefing have several similarities to step called defusing in the 3D-model (Zigmont et al., 2011a). Although the 3D-model refers this to as emotional ventilation, in both cases, the students are encouraged to share their reactions and emotions regarding the simulation-based exercise. This way, the instructor can identify the needs of the students in relation to the learning objectives. Similarly, during the first step, reactions, in the Gardner's step-wise strategy in debriefing (Gardner, 2013), students are encouraged to "clear the air" (p. 169). This means that students share their experiences, reactions and emotions regarding the

simulation-based exercise. Subsequently, the instructor addresses these aspects and guide the students towards the learning objectives. Moreover, in Ledermann's Three Phases (Ledermann, 1992), this step is explained as systematic reflection and analysis. During this step, the students describe their experiences regarding the simulation-based exercise. Consequently, the instructor can identify and review these aspects and guide them through the discussion. Additionally, in Petranek et al (1992) E's of debriefing, the debriefing process begins with events and emotions. In this matter, the students are encouraged to describe the situations of, and share their experienced emotions, regarding the simulation-based exercise.

However, some researchers have presented another way of beginning the debriefing session. This is presented in both the 3D-model (Zigmont et al, 2011a) and in the Debriefing Performance Strategy (Cant & Cooper, 2011). As for the 3D-model, Zigmont et al (2011a) explain their initial stage as pre-debriefing. This stage takes place prior to the debriefing session, where the instructor explains the content of debriefing and the participation of the involved roles in debriefing (Zigmont et al, 2011a). Similarly, Cant and Cooper (2011) explain that the preparation of debriefing is an essential component of the process. This preparation includes the development and training of the educator, setting an appropriate environment and preparing the learner by suggesting a plan and inform objectives. Both Zigmont et al (2011a) as well as Cant and Cooper (2011) explain pre-debriefing and the preparation stage as the initial step of the debriefing process. In contrast to this, the empirical material of this study did not demonstrate a step or stage prior to the debriefing sessions. Rather, this study confirmed that the debriefing process starts with an initial phase and/or the introduction of the debriefing. Despite this, this study did not deny that there are other ways of beginning the debriefing sessions. The results evidently demonstrated that the debriefing session could start with the instructor providing immediate feedback about one teams' performance. In this case, the instructor detected that specific performed actions were insufficient or incorrect. Subsequently, the instructor identified and clarified the problematic steps within the performed actions and in turn, provided direct feedback and instructions. As the instructor identified a specific action as critical to learn, this became a priority to emphasize prior to further discussion. This occurrence of critical issues was one way of how the structure of debriefing deviated from the general structure.

Continuously, during the central phase, the simulation-based exercise was recreated. In this case, an overview of the simulation-based exercise enabled problematic actions and interactions to be framed and defined. Subsequently, these framed and defined problems were systematically reviewed, evaluated and assessed by the students as well as the instructor. In turn, alternative solutions to the specific problems were discussed and selected.

In conjunction to this, several researchers explain these steps as central in the debriefing process. For instance, Cant and Cooper (2011) simply refers these step as dialogue. In this stage, the students first describe the events, analyse them and subsequently applied as examples to professional practice (Cant and Cooper, 2011). Another example is in the 3D-model, where these steps are referred as discovering and deepening (Zigmont et al, 2011a). In the step of discovering, performance is analysed and evaluated in order to identify gaps and matches between existing and targeted mental models. As a consequence, and in the step of deepening, lessons from the simulation-based exercise are related to professional practice (Zigmont et al, 2011a). Likewise, in Gardner's step-wise strategy (2013), this step is referred as understanding. During this step, events are explored in order to navigate the students to new understandings and skills. In addition, lessons learned are related to examples from realistic situations (Gardner, 2013). Furthermore, Petranek et al (1992) explain this in the last four phases of E's of debriefing, which includes explanation, everyday application, employment of information and evaluation. First, the students review, analyse and explain their actions, which in turn are related to the professions' situations in realistic setting, not in

the simulation. Subsequently, this enable the learners to understand how they translate the skills and emotions from the simulation to professional work life. Based on this, the learner evaluates what significant actions that can be applied and what actions were insufficient and needs to be improved (Petranek et al, 1992). These steps have several similarities to the results of this study. Both include reviewing, evaluating and assessing performance, which in turn, affirms solutions and lessons.

In this matter, previous research regards the steps in the central phase as naturally consecutive. However, the results indicated that the debriefing process consisted of flexibility and versatility. In conjunction to this, the study found that different procedures were not dependent or determined to follow a chronological order. Rather, these procedures varied and emerged in different steps of the debriefing process or in conjunction to another procedure. For example, while framing and defining the problem, the problem was also described, reviewed, analysed and assessed. And in contrast, while reviewing and analysing the problem, the problem was also framed and defined. This variation or interoperating relationships highly reflects the flexibility in the systematic structure where the way of managing the problems were adapted to the situation. This type of flexibility and versatility was found in the situations where additional focus in meeting the learners' needs of learning through shared reflections and ideas extended the steps in the debriefing process. The flexibility and versatility portrayed itself as extended discussions, additional questions and repetitive and/or elaborative explanations. As a result, this was another way of how the debriefing sessions deviate from the planned debriefing.

Furthermore, during the final phase, the simulation-based exercise was summarized and finalized. In this phase, several researchers explain that these steps take place in the end of the debriefing sessions. In the 3D-model, this step is simply described as summary (Zigmont et al, 2011a). Similarly, to the findings of this study, the lessons learned from the sessions are reviewed and summarized. Likewise, in final step of Gardner's step-wise strategy (2013), called summarize, learned lessons are reviewed, discussed and applied to future events. Even the final phase of Ledermann's three phases (1992), this is explained as generalization and application, which means that knowledge is generalized, as learned lessons, and in turn, applied to future events. Additionally, Cant and Cooper (2011) explain this step as closure, where final questions are answered and key learning points are summarized.

In conjunction to this, this study found several similarities to previous research. The final phase consisted of key learning points, accumulated from the review and analysis of the actions and interactions, that were knit together. Critical conclusions, practical solutions, learning objectives and rules were various forms of key lessons that were raised again. Despite the fact that they were more prominent in the final phase, this study found that these consistently occurred throughout the debriefing process. Critical conclusions, practical solutions, learning objectives and rules were used as partial closures and ways of generalizing knowledge. From this perspective, this was yet another way of how the structure of debriefing deviated from the general structure.

## **Instructions in Post-Simulation Debriefing**

This study found that instructions in the debriefing sessions were given in various forms and organized differently in the debriefing sessions. Instructions were portrayed as questions/questioning, direct and indirect feedback, guided discussions, instructions as self-dialogue, through contrasting, using if-scenarios or providing key lessons, summaries, crucial conclusions and solutions.

As for the questions/questioning, this study found that throughout the debriefing process, questions and questionings had various forms. While open questions enabled the answers to

be motivated, closed questions enabled direct and straight answers. Previous research has emphasized the significance of open and closed questions. In this regard, one example is Wickers (2010) explanation of Socratic questions, such as what, when, how and why, that are used to enhance discussions and foster self-reflections (Wickers, 2010). However, apart from using obvious ways of open and closed questions, previous research has not explored this field. This study found that both open and closed questions equally meant various forms of questioning. This means that, for instance, rhetorical questions, suggestive questions and double-directed questions, were forms of questioning. In the empirical material, rhetorical questions consisted of an obvious answer in its question as a way of making a point. In comparison to this, suggestive questions indicated that a specific answer should be given in the response. These suggestive questions had various forms. For instance, direct questions were questions like ‘Did you show your intentions?’, where no explanation was needed. Another example was confirming questions which were questions that lead to answers with a specific point, such as ‘What is required in the fog to clear up this situation?’. Moreover, presumptuous questions were questions that stated only one point of view of an argument, for example ‘Is it possible that there are incompetent drivers on-board?’. Additionally, double-directed questions consisted of several issues, but only required one answer, for instance ‘Is there a probability that a ship that drives this fast have radar and control of the situation?’ In these matters, various forms of questions acted as questioning an action, event or situation, which promoted thinking and served to develop insights and answers.

Another way of giving instructions was through direct and indirect feedback. In conjunction to this, previous research explains that direct feedback is visible, clear and immediately directs learning and development. In contrast to this, indirect feedback is explained as invisible and background acting (Seidel et al., 2005). Both approaches were recurring in the empirical material. For instance, direct feedback was given in Excerpt 5 and Excerpt 14. While Excerpt 5 took place in the beginning of the debriefing session, Excerpt 14 took place in the end of the debriefing session. Regardless, in both examples the instructor gave immediate feedback about the students’ performance and/or explained what the necessary actions were. As for the indirect feedback, both Excerpt 2 and Excerpt 13 are examples of such feedback. While Excerpt 2 took place in the beginning of the debriefing session, Excerpt 13 took place in the central phase, during the step of problem analysis and problem solution, of the debriefing session. Despite this, in both examples open questions were used as a way of enhancing reflective discussions that guided the students towards specific answers.

As for discussions, previous research emphasize that guided discussion is an essential component in debriefing (Chronister & Brown, 2011). In conjunction to this, several researchers emphasize that guided discussions aim to enhance reflections, whereas guided reflections are processed through discussions (Cant & Cooper, 2011; Chronister & Brown, 2011, Dreifuerst, 2009; Fanning & Gaba, 2007; Gardner, 2013; Ledermann, 1992; Zigmont et al., 2011a; Zigmont et al., 2011b). Regardless, there are three essential components, such as guidance, discussions and reflections. In this regard, Ledermann (1992) explain that during the discussions, the instructor uses the information that is generated in the simulation-based exercise and guides the students’ procedures and approaches to the learning objectives. This study found that several guided discussions were led by the students but guided by the instructor. In this matter, both Excerpt 8 and Excerpt 11 are examples of such occasions and occurred in the central phase of the debriefing process where the simulation-based exercise was reviewed. In both examples, the students indicated some forms of misconceptions, lack of understandings of the/or incorrect performed actions. The instructor identified these when the students shared their reflections regarding the specific performed action and explained their reasoning behind it. Subsequently, the instructor used these aspects as key learning points and guided them towards the learning objective. Despite this, in several occasions, guidance with

instructions were given similarly to a self-dialogue by the instructor. Both Excerpt 14 and Excerpt 15 are examples of instructional guidance. In both examples, the reasoning behind each alternative action as solution were explained. It was portrayed as a direct approach in which rules were embedded in practical context and where the guidance was straightforward and clear. Both examples also use 'if'-scenarios, which characterise the course of the self-dialogue. Using 'if'-scenarios was a method of emphasizing alternative consequences that could occur based on a specific performed action. By giving 'if'-scenarios were a form of instructions that guided the students towards a specific understanding, explained what reasoning was expected and what actions that were necessary. For instance, in Excerpt 15, the instructor explains that 'if he does not have any radar, then he does not know that you can solve the situation. Same thing here, if he does not see you, then you have to solve the problem, because you have radar and those are the rules. That you solve the problem and show your intentions clearly.'

Using 'if'-scenarios was also an example of the method of contrasting and comparing. According to previous research, contrasting and comparing are methods in providing immediate feedback or direct instructions (Seidel et al., 2005). However, previous research has not explored this method in debriefing. As a response, this study found that contrasting and comparing could operate between two opposite sides of a context. For instance, the general overview of the simulation-based exercise in debriefing could transform to the specific reviews of the performed actions, events and situations. As earlier mentioned, and another example, was when the systematic design of conducting the debriefing sessions were adapted to a more flexible and versatile approach to the structure of debriefing. Furthermore, the method of contrasting and comparing was also a way of emphasizing how conventional actions, events and situations led to consequential, rare or crucial actions, events and situations. Additionally, contrasting and comparing between the general and the specific can also be recognized in the contexts where theoretical principles are put in practical situations. Overall, contrasting and comparing occurred in various forms. Despite this, this method had a specific character throughout the debriefing process, which was when complexity met simplicity. In this matter, the empirical findings demonstrated that complexity, regardless if it concerned complexity in understandings or complexity in practical situations, needed to be clarified. As a response to this, simplicity was provided. This means that the key learning point had an uncomplicated form, could easily be understood and no difficulties were presented. Providing simplicity was also a way of generalizing knowledge.

As for generalizations, previous research emphasize that generalizations and summaries are essential ingredients in the debriefing process. For instance, in the 3D-model (Zigmont et al., 2011a), Gardner's step-wise strategy (2013), Ledermann's three phases (1992) and Cant and Cooper's Debriefing Performance Strategy (2011) all demonstrate that generalizations and summaries are steps that should occur in the end of the debriefing process. However, this study found that generalizations simply means that knowledge is generalized. Based on this perspective, generalizations were portrayed in various forms. Examples of these are in asking questions and through questioning, as instructional guidance, through contrasting and comparing, in key lessons, summaries, partial conclusions and problem solutions. This means that generalizations occurred throughout the debriefing process and not just in the end. It was a method in the debriefing process were generalizing knowledge led to the affirmation of skills.

## **Conclusion**

The purpose of this study was to investigate post-simulation debriefing in maritime training. To this purpose, this study resulted in several findings based on its two focal areas: the process of post-simulation debriefing and instructions in post-simulation debriefing.

As for the process of post-simulation debriefing, this study found that the debriefing process was designed to be systematically conducted. It consisted of three primary phases, such as the initial phase, the central phase and the primary phase. In turn, it consisted of several key steps that formed the process, such as the introduction of the debriefing session, overviewing the simulation-based exercise, framing and defining the problem, specifying the simulation-based scenarios, problem analysis and problem solutions, key lessons and summaries, the closures of debriefing and finally, the purposes with and goals in debriefing. Despite the systematic structure of debriefing, the study found that the debriefing process consisted of flexibility and versatility. The flexibility and versatility portrayed itself as extended discussions, additional questions and repetitive and/or elaborative explanations.

As for the instructions in post-simulation debriefing, this study found that instructions were portrayed as questions/questioning, direct and indirect feedback, guided discussions, instructions as self-dialogue, through contrasting, using if-scenarios or providing key lessons, summaries, crucial conclusions and solutions. In conjunction to this, the study confirmed that the various forms of instructions arose consistently in the debriefing process. This means that it was not depend on the phase or step of the process, rather, it depended on the needs in the situation. Furthermore, this study also confirmed that the various forms of debriefing aimed to generalize knowledge to skills.

## **Future Research**

In this matter, previous research has already contributed with several recommendations. As earlier mentioned, one example is where in the simulation-based experience the significant gains occur and what knowledge have been gained in the simulation-based experience. Various leadership styles and impacts of individual components are additional areas that need to be studied. Also, fundamental questions such as how, whom and what to debrief are questions that need to be explored. Nevertheless, these are significant topics for future studies in maritime education. In conjunction to this study, the recommendation is to further explore, develop and contribute with knowledge within one of the focal areas. However, debriefing is still an unexplored area that need empirical findings from educational researchers. For this reason, studies that focus on the topic in various disciplines are much appreciated.



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