Temporal and Material Conditions for Instruction in Simulation-Based Maritime Training

Charlott Sellberg, University of Gothenburg, charlott.sellberg@gu.se
Hans Rystedt, University of Gothenburg, hans.rystedt@ped.gu.se

Abstract: Simulator-based training in maritime education is a highly structured and technological advanced learning activity. By analyzing video recordings of exercises in a navigation course, the study specifically explores: a) the use of different tools and technologies in maritime training, and b) how the instruction shapes and are shaped by the temporal organization of the events. The results highlight instructional matters of connecting the general learning objectives with the particular details of the scenario throughout the whole training session.

Keywords: simulation-based training, instruction, technology, temporality, maritime education

Background
Training in simulators regularly involves three phases that afford different material and temporal conditions for instruction. First an introduction to the day’s assignment is made, a so-called briefing. Typically, the introduction is focused on practical information – how to carry out the assignment and the learning objectives (Wickers, 2010). After the introduction, the scenario takes place where certain aspects of the work is recreated or mimicked for training purposes. As a final step, a debriefing is carried out, which offer opportunities for post-experience analyses and reflections on the event. Debriefing has been described as the “attempt to bridge a gap between experiencing an event and making sense of it” (Fanning & Gaba, 2007, p.116), as well as a way to integrate theoretical knowledge and practical experience. For these reasons, the debriefing phase is often seen as especially important for learning (e.g., Fanning & Gaba, 2007). In simulation-based training it is common to use different technologies for instruction and feedback. In health care, for instance, there have been studies of video assisted debriefs (e.g. Savoldelli et al., 2006) and in maritime training the use of simplified visualizations have been discussed as significant opportunities for learning (Honvendt & Arnseth, 2013).

The analytical framework of this study is based on Suchman’s (2007) seminal work on plans and situated actions. Following this, instructions are seen as general prescriptions for action and their use are taken as contingent on the particular occasion in which they are applied. As the situation and its material and social circumstances set the conditions for actions, instructions are necessarily partial. It is only in the actual course of actions that instructions acquire their specific meaning. Even if the students are told what to do during the briefing, these instructions are unable to specify exactly what the students should to do or how to handle the situations. A central question is also when and how the instructions should be applied. During the actual simulation, another form of instruction takes place, which “draws pedagogical strength from exploitation of the unique details of particular situations” (Suchman, 2007, p. 45). By monitoring the actions of the students it is possible for the instructor to address the particular problems that the students encounter at the precise occasion where these problems emerge. In the debriefing phase, the particularities of the practical assignment and the actions taken are reconstructed and revisited in retrospect. In this phase, when the outcome of the assignment is known, it is possible to assess the appropriateness of performed actions. Here, the prospective plan is revisited to filter out the particularities that accord or diverge from the initial plan (Suchman, 2007).

Method
The methodological approach was based on Heath, Luff and Hindmarsh (2011) principles for video-based research. During a pilot study, three different training sessions were video recorded, in all 15 hours of training. Cameras were placed in the simulators, the instructors’ room and the briefing room to capture interactions that were spatially distributed during training sessions. In addition, observations and informal interviews with the instructors have been central for understanding the educational content in navigation courses.

Results
In the technologically advanced simulator environments training activities are highly structured in order to connect the general learning objectives with the particular details of performance in the scenario.

In the briefing phase, the material conditions in the classroom setting and the use of a power point presentation set the frame for instruction. The power point presentation, produced by the instructor in advance,
connects the exercise to the learning objectives. Furthermore, the instructor’s use of power point, talk and gestures structures the instruction and establish joint attention to different aspects of the upcoming scenario (cf. Lymer et al., 2009). In this phase, the instructions are rather concrete and aimed to prepare the students for the upcoming exercise. At the same time, the instructions also have to address the various contingencies that might emerge in the upcoming situation (cf. Suchman, 2007). The instructions are thus both general and concrete.

During the scenario, instructions are occasioned by the monitoring of students actions on a screen in the instructors’ room. When it is evident that the students display lack understanding of how to go on, it makes relevant a closer inspection of their performance and for different types of corrections. Instructions from the instructors’ room are mediated by radio as a part of the scenario and are suited for in-role instructions that maintain the activity or for straightforward directives on what to do next. In contrast, face-to-face instructions on the bridge operations simulator draw on a rich context of material and social resources, and afford instruction on the many complex matters of navigating a ship.

In the debriefing phase, the prospective instructions in the briefing are revisited, connecting the particular scenario back to the general learning objectives of the exercise. In this phase, instructions take the form of assessment, providing feedback that is connecting the practical actions to the theoretical content of the course and to professional concerns. During debriefing different technologies provide the material conditions for revisiting the learning objectives and reconstructing the scenario. A power point is used to revisit the same points as during briefing, but now in retrospect. The use of power point here reconnects the scenario to the learning objectives, and affords assessment in general terms. The use of simulator technologies, in this case a playback of the scenario from a birds-eye view, makes it possible to reconstruct the prior actions and makes them accountable. In this way, the use of playback enables instruction and assessment of specific details of the students’ prior conduct.

Conclusion
The results highlight the importance of systematic professional guidance and feedback in simulator-based training, supporting results from research on healthcare simulations (Rystedt & Sjöblom, 2012). The results address instructional matters in simulation-based training: a) how to connect the general learning objectives with the particular details of the scenario, b) how to bridge between theoretical knowledge and practical action, and how to relate the training professional to professional concerns. The results are in line with literature on debriefing, describing this phase as a way to integrate theoretical knowledge with practical performance, but this study contributes with new perspectives on how this is done through a structured process of abstraction and application in and through all phases of training. Furthermore, the results illustrate how technologies for feedback enter in educational practices. A pedagogical potential of such technologies is that they provide a record of the actions taken during the scenario that makes students’ actions accountable. In this way their actions are publicly observable and discussable, opening up for feedback and reflection on a variety of theoretical and practical issues involved in the practice of navigation.

References