

SAFETY

simulation for medical practice

SIMULATION APPROACH FOR
EDUCATION AND TRAINING
IN EMERGENCY

An introduction to medical simulation

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Summary

Welcome to the e-learning module "Introduction to medical simulation". We will be covering some basic principles of simulation in healthcare. It can be used for many different target groups, in many different settings, and for many different aims. This text accompanies our video presentation on the platform.

Simulation

Simulation as social practice

Simulation is a social practice. [1] A social practice can be defined as a contextual event in space and time, conducted for one or more purposes, in which people interact in a goal-oriented fashion with each other, with technical artifacts (the simulator), and with the environment (including relevant devices).

To understand simulation in this way emphasises that we need to look beyond the technical devices and procedures, and to include concepts like purpose and motivation in order to optimize the use of simulation. Just having good simulation devices and good simulation scenarios is not enough. As Caro wrote, "the key is the program, not the hardware". [2]

There are many different settings, in which different types of simulation devices are used. David Gaba distinguishes eleven dimensions, when describing simulation in different contexts: aims and purposes of the simulation activity; unit of participation (e.g. individual or teams); experience level of participants (e.g. pre-graduate or post-graduate); health care domain; professional discipline of participants; type of knowledge, skill, attitudes, or behaviours addressed; the simulated patient's age; technology applicable or required (e.g. simulated patient or manikin); site of simulation (e.g. simulation center or in-situ simulation); extent of direct participation (e.g. observers vs active participation); and method of feedback used (e.g. debriefing model). [3]

Simulation was shown to be effective on many levels: participants like it, learn from it, apply what they learned in practice, and what they apply has a positive impact on patients, their relatives, cost etc. [4-8]

Purposes and settings

The goal of simulation can be basic education, continued training, work system analysis, development of devices or processes, or research. Distinguishing what the actual focus should be is a key element in determining what kind of equipment is needed, what skills simulation-facilitators need, what kind of scenarios can and should be implemented. The SAFETY+

programme teaches education and training, so learning aim and objectives are important. The aim covers the overall achievement that participants should get out of their participation (e.g. manage a hand-over situation in clinical care). The objectives then describe more fine-grained competencies needed to reach the aim (e.g. being able to describe the patients status using the ISBAR structure – see module 9 for an explanation of ISBAR).

It is important to pay attention to the verbs within a learning objective, as they determine the level on which participants should learn. Blooms taxonomy is one of the most established taxonomy for such verbs. [9] “Knows” is, for example, less complex than “is able to criticize” and each level likely requires different approaches (e.g. time, or type of teaching method) to help participants reach it.

Also, the setting in which simulation unfolds has an impact on the learning opportunities in healthcare simulation. In simulation centres, where participants leave clinical work to take part in simulation might allow to get more into a learning mode and reflect – in a “strange” setting about the work at home. Bringing the simulator to the actual clinical environment might, on the other hand, help participants to make learning experiences that are closer to their actual work and there might be more learning on the organizational level. [10]

Phases of the simulation setting

Wherever simulation takes place, participants typically work through different phases of the “simulation setting”. [11] We distinguished 8 prototypical phases within a simulation setting:

1. In the setting introduction, facilitators and learners get to know each other and hear about the course, its aims and objectives. They establish ground rules of engagement and learn about the logistics of the course and the place.
2. In the simulation familiarization participants learn about the possibility of the simulation site as such and the simulative method used. For example, in manikin-based simulation, participants learn how to use the simulator as a technical tool. Where can they use liquids, where should they not do so? When working with simulated patients, one would explain, how the interaction with them can and can not unfold (e.g. how much of their clothes can be removed).
3. In one or more theory modules, facilitators might present core concepts needed for the scenario and debriefings (e.g. principles of safe hand-overs and communication techniques).
4. In the scenario briefing, participants hear about the “here and now” of the case and patient that is actually simulated. They get information about the backstory and the tasks they should perform. Here also the objectives for the scenario are typically stated.
5. The scenario itself is the experience episode that participants will be debriefing on later. It can typically be seldom challenges; those, challenges, where participants should not make a mistake in practice; where the dynamics of the scenario are very complex; where training in practice is very expensive; or actions that many people perform often.
6. The debriefing is the reflection period during which participants and facilitators reflect about strengths and weaknesses of participants’ approach during the scenario in regards to the learning goal. There are a number of structures that can be used to facilitate this discussion.

7. The course ending closes the course and is a place, where participants can summarize what they take home and can evaluate the course in oral and maybe written feedback.

The different phases are connected and affect each other. If, for example, participants do not really understand, how the simulator functions then they might have trouble understanding the scenario. Consequently, it might be necessary to spend time in the debriefing explaining the simulator as a tool again – time lost for discussing learning goals.

Debriefing

The debriefing is typically thought of the phase in which most of the learning occurs. It is also the phase that is most «scary» for facilitators. There are many different models out there. We work with a «mature» framework by Barbara Steinwachs. [12] We like the simplicity of the model and would argue that the phases identified are at the core of most of the modern debriefing approaches.

First the facilitator sets the scene with explaining participants, how much time they have for the debriefing and what should happen in its course. This can also be a chance to defuse by just saying, how participants feel.

In the description phase, participants describe the major steps in the scenario to create joined recount of what happened. This serves to identify topics that should be discussed and allows the facilitator to gauge, how much participants learned in relation to the learning goals.

In the analysis phase the facilitator guides participants through reflecting what strengths and weaknesses they had in their performance in regards to the learning goal. The facilitator helps to understand, how the team produced good performance and what they can do to improve aspects that did not go so well. Here it also makes sense to analyse those things, that went well and how participants kept the different processes with acceptable limits of the corridor of normal performance. [13] This focus on learning from success is often a more psychologically safe approach to the discussion and can help the learning.

In the application phase the individuals formulate, what they can take home with them.

Facilitators' competencies

To guide participants through the different phases of the simulation setting, they need competencies on many levels. [14, 15] Examples of what facilitators should be able to do:

- Identify learning needs
- Translate learning needs into learning goals
- Design and stage simulation scenarios
- Observe participants during the scenarios
- Manage the technical aspects of the scenario
- Facilitate a debriefing
- And many more...

Learning theory

When looking at the learning theoretical assumptions, one can distinguish different phases and dynamics that simulation makes possible. With reference to Kurt Lewin, [16] we distinguish the “unfreezing”: Participants get the feeling that what they do so far is not “ideal” and build up a readiness for change. This requires to implement the scenario in a way that is matching with the participants states. Too little of a challenge and they don’t move. Too much and they might resist or leave. In the following change state, participants might then get alternative ideas on what to change – for example, hearing about a new communication technique. In the last phase the “re-freezing” it is about practicing the new ideas. They should maybe not freeze and still be flexible – the model is a bit old – but the idea is to help participants become a bit more confident in what they learned new.

Simulation realism

One argument against simulation is often that it is not quite realistic (yet). A patient simulator does not really give a good clinical impression, simulated patients do not “have” the disease they pretend to have. There are many “x-elements” in the equation below. Many things that can not be simulated.

$$\text{Simulation reality} = (\text{Clinical Reality} - X) + Y$$

However, there are also the Y-elements. Those aspects that can be simulated, *only* because the simulation is unrealistic (and no real patient can get harmed). Scenarios can be repeated, the underlying dynamics can be made extra clear, participants can handle scenario above their competence level to see, how far they would get. The Y-elements are unrealistic but can really help the learning.

The social character of simulation requires that people want to “play along”. If participants do not trust the facilitators about their good intentions, then they might question each little bit the scenario and might not engage in what Umberto Eco called the “Fiction contract”. [17] They do not *want* to believe in the scenario and its sense and thus will not get a lot of learning out of the scenario.

Summary

With this short text, we wanted to describe simulation as a social practice with its own rules and sketch some of those in an overview fashion. A lot is written about simulation and we hope you got curious to see our modules and read more in different places.

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