White Paper

> *We give them multiple opportunities to "do it right", applying the concepts of overlearning and automatization, creating muscle memory for the "right way"*
>
> Hunt E. et al., 2014

Rapid-Cycle Deliberate Practice in Healthcare Simulation

An Introduction to the Concept, Pedagogy, Research, & Future Opportunities

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Laerdal
helping save lives

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Background

The Laerdal Medical mission is ***Helping Save Lives*** and we do this by supporting and empowering those who save lives. To deliver on our mission, there is a need to not only understand "the job to be done", but also the context. The leading cause of death and illness globally is not necessarily access to healthcare, but more often the quality of care (Kruk et. al., 2018). In an Institute of Medicine report from 2018 it was estimated that in the USA alone, more than *400 000 persons die per year from preventable mistakes or harm during surgery or in the care of healthcare personnel* (see Makary & Daniel, 2016, and references therein). These numbers are likely to be the same, relatively speaking, in most high-income countries, and possibly more devastating in low- and medium-income countries. Hence, the context to deliver on our mission of ***Helping Save Lives***, might be closely connected to quality in healthcare.

Both studies above mention education in general, and simulation specifically as one way to improve the education and the quality of care delivered by healthcare personnel.

Simulator technology has developed considerably over the years. Unfortunately, the same cannot be said for the pedagogical underpinnings and methods used to support simulation activities. Importantly, "simulation" is not one method. "Simulation" is used to describe an variety of methods; from one person practicing a skill alone to a big operating theater with a cross-disciplinary team performing a complex operation involving multiple procedures. And the main difference between these, from a simulation perspective, is not necessarily the number of people in the room, or the fidelity of the simulator: It is the educational approach.

The Challenge

Oftentimes, simulations are never repeated until mastery level is reached. Constraints pertaining to available time, facilities, or lack of facilitators may all be common and good reasons why a scenario is only done once, with the follow-up debriefing. But from a psychological and pedagogical point of view, this approach is likely to limit the potential for learning. Participants seem not to be given the opportunity to rehearse and repeat, which means that competency and confidence are not developed to optimal potential. This can directly impact on the participants' learning outcomes. The risk of lowering self-efficacy when the learners do not have the chance to correct and improve their mistakes' during simulation is also highly relevant.

One way to mitigate this, is to add more simulation training to the existing ones. However, overarching challenges seen globally in simulation labs at education and clinical institutions include lack of time and lack of competent faculties (Anderson et al., 2014).

Therefore, a better way to mitigate the lack of repetition, is to embed repetition into the existing training without adding more simulation days or hours. This can be done by the Rapid-Cycle Deliberate Practice simulation methodology.

What is Rapid-Cycle Deliberate Practice

Rapid-Cycle Deliberate Practice (RCDP) can best be explained by comparing it to the more traditional simulation* methodology. Simulation education and training in healthcare is normally divided into four phases (figure 1):

1. **Preparation**
   Both the simulation attendees (the learners) and the facilitator (the educator) need to prepare for the planned simulation training. For the facilitator this will be preparation pertaining to the learning objectives to be addressed and the scenario to be used, as well as preparation regarding the room(s) and equipment's in use. For the attendees, the preparation is related to orientation towards the topic of simulation: being primed on what to be trained in and prepared mentally for the simulation day.

2. **Prebriefing**
   The prebriefing (also just called briefing) is when the facilitator informs the simulation attendees of what is about to happen. This process includes i) going through the learning environment and where to find the equipment needed, ii) aligning on the safe learning environment policy, iii) explaining the case to be used in the upcoming scenario and, at the end of the prebriefing, iv) describing the intended learning outcomes for the training.

3. **Scenario**
   This is the practical simulation training where the clinical case is to be solved or worked on. The facilitator is paying close attention to what is going on to be able to run a good debriefing immediately afterward.

4. **Debriefing**
   The debriefing is when the scenario is being discussed and analyzed and the reflections are done. Typically, this part would consist of i) immediate reactions to the simulation and some repetition of the intended learning outcomes, ii) a chronological walkthrough of the scenario, iii) reflections, discussions, and analysis of what happened and why, and iv) finally, the individual take-homes from the training session. The goal is to clarify what can be done better next time and thereby change the behavior.

* "traditional simulation" refers to simulation where learners simulate in teams and where both prebriefing and debriefing is included.

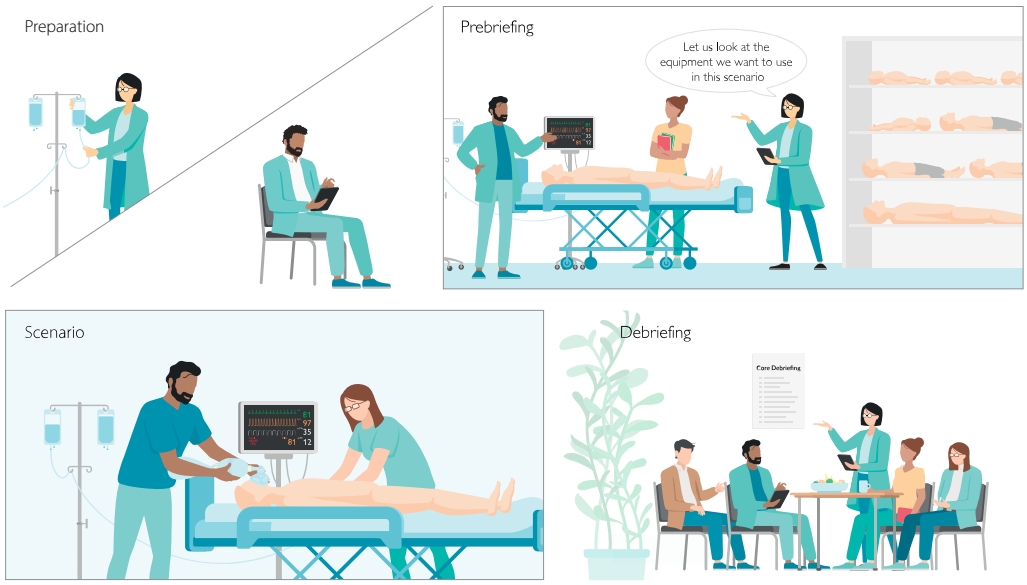

Figure 1. The structure of traditional simulation

It is well acknowledged, and supported by research, that the debriefing is key to simulation and to anchoring the learning outcomes (Maestre & Rudolph, 2015). This is due to the discussions and reflections that – at least cognitively – lead to new understanding and ultimately the desired behavior change. There is no doubt that the debriefing is very time consuming. When the debriefing is done, the common "standard" is that it ends the simulation training. However, some simulation labs let the learners repeat the scenario after the debriefing, but this approach seem to be the exception rather than the rule. The value of repeating a scenario has been addressed by Zulkosky and co-workers who found improved clinical knowledge and performance among student nurses (Zulkosky et al., 2021). Hence, by not giving the learners the opportunity to repeat the scenario, the learning potential might be reduced.

RCDP is structured almost the same way as described for traditional simulation above. The exception is that the debriefing phase is excluded (figure 2). Instead, the scenario is stopped at certain points, time-outs, when the facilitator gives the learners feedback on the job done so far. This feedback and potentially a short reflection leads the learners to rewind the scenario and redo what was just done based on the feedback. In this way, the learners are given the immediate opportunity to repeat and improve. Such time-outs are given throughout the scenario for the benefit of repetition to "do it right" or better. At the end the learners will have repeated several steps of the scenario several times, which is critical for drilling motoric skills as well as decision making.

We see that the debriefing in RCDP is done in small chunks during the scenario and not after the scenario is completed. Hence, the primary characteristic of RCDP follows three steps, i) the learners pause the scenario (time-out), ii) during the time-out, feedback or a quick discussion or debriefing is done, iii) learners are directed to resume the scenario prior to what they did which precipitated the time out and rethink their approach based on the quick reflection.

What triggers these time-outs seems to depend a bit on who you ask. Based on the first description of this model using the RCDP term, Hunt et al. (2014) let the simulation attendees

complet the whole scenario first without interruption. The facilitator was then able to identify weak points of the training, the gap analysis. Then, in a second run of the scenario, the facilitator was able to time out during the session and give feedback enabling repetition and improvements.

Other researchers have not used a first run-through of the whole scenario but rather conducted time-outs during the primary simulation. Hence, some variety of how to run the RCDP is found (Perretta et al, 2020). The time-outs are in these cases triggered by mistakes or opportunities for improvements.

However, we argue, there might be other reasonable triggers for stops as well. Why not make a stop at a critical phase and have the learners redo this to strengthen their competence and confidence?

Based on the above and the research presented below, we will argue that RCDP can be understood as a method that provides both variability and flexibility in its execution. These variables include: i) the use of a first go-through / the gap analysis, ii) what triggers the time-outs, iii) the time spent on the time-outs, iv) how many times one repeats a given skill in each scenario, and possibly more.

At first sight and based on the description above, RCDP has established itself as a good methodology when it comes to procedural skills training (also see chapter on "Research" for further details). However, the ability to immediately improve by repetition may also lend itself for simulation focusing on non-technical aspects like closed-loop communication and shared understanding of a given clinical situation.

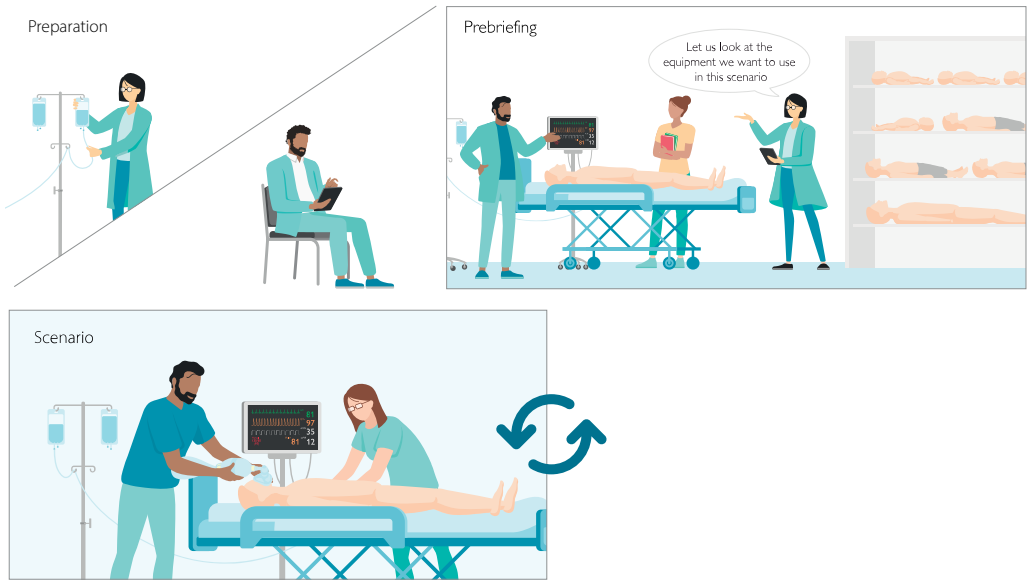

Figure 2. The principal structure of RCDP. During the scenario, the learners are stopped, quick feedback is done, and the scenario initiated again where the learners can repeat what they just did based on the feedback. In this way the learners can experience immediate improvement on skills and also experience improved confidence.

How Rapid-Cycle Deliberate Practice adds Value

This chapter will delve into how RCDP is a valuable addition to existing simulation methodologies. We will focus on some of its key strengths and benefits, and how it may be synergistic to the already established methodologies.

Competence & Confidence

The added value of RCDP is the opportunity to repeat sections of the given scenario, be that skills, situational awareness, or clear communication. Thus, leaving the simulation lab, the learners should not only have seen or understood the areas of improvement or changes needed that usually is the intended outcome of traditional simulation, but they have rehearsed them through repetition and ought to have already improved compared to the first try. It seems fair to assume that providing participants with an opportunity to repeat until mastery, will have a positive effect not only on their competence, but also their level of confidence.

Clinical Outcomes

The end-goal of all healthcare simulations is the improvement of clinical outcomes. It is difficult, if not impossible, to link clinical outcomes to the methodology of simulation. However, if we didn't believe that rehearsing procedures and clinical work has a positive effect on outcomes, why would we bother with simulation in the first place? We might not be able to prove it, but our statement here is that if there are learning or training methodologies that affect the competence and confidence of a healthcare worker, those methodologies have the potential to affect clinical outcomes positively.

Scalability & Cost-Efficiency

RCDP, as described here, is not primarily a methodology to improve scalability. However, RCDP properly adapted, has the potential to be much more time efficient compared to the more traditional simulation with debriefing. Having this potential of being more time efficient adds value in a cost-efficiency perspective. Amidst cutbacks, staff shortages, increased pressure for continuing education, good and time efficient solutions are critical. Also, what if RCDP could be run in a best practice structured peer-to-peer session, without a facilitator or educator present during the scenario simulation? And what then if this RCDP model could be run any time of the day? In such a case, the scalability would increase significantly. More on this later.

Pedagogical Underpinnings

Pedagogy is a pluralistic discipline where a set of learning theories are used to describe and support educational methodologies. Having support in several learning theories for a given educational method, helps us to understand, describe, develop, and implement that given methodology's full potential. Thus, by looking into different learning theories that support RCDP, we can better understand its value and educational potential.

Deliberate Practice

The essence of deliberate practice is to improve the current level of performance through repetitive actions, but actions with a tweak. The learning path must be constantly monitored and adapted to your current level and "the next level". Think here of Vygotsky's zone of proximal development which briefly states that "there is a distance between what a learner is capable of doing unsupported, and what they can do supported". It is in this gap between their capabilities and where they need support from someone with more knowledge or expertise ("more knowledgeable other") that the simulation should take place. The simulation activities need to be designed to take it one step further than the learner's current level. Keys to achieving this are through motivation, pre-existing knowledge, immediate feedback, and knowledge of one's performance. Through this, the learner should repeatedly perform the task (Ericsson et al., 1993). In the view of RCDP, it is also of importance to note that improvements of performance, in accordance with deliberate practice, are seen when learners are

i) given a task that is well defined; a task just beyond their abilities,
ii) motivated to improve,
iii) given meaningful and problem-solving feedback and,
iv) provided opportunities for repetition and gradual refinements (Ericsson, 2008).

We can see how well this theory creates a foundation for RCDP simulation with good learning outcomes, solid feedback, and opportunities for repetition. Deliberate practice is well acknowledged to have a major role in the best practices of healthcare education simulation and is thoroughly described elsewhere (McGaghie et al., 2010, Motola et al., 2013).

Mastery Learning

The theory of mastery learning was founded by Bloom in 1968 when he stated that "skills can be mastered by 90% of a student population if given the individual time needed". Hence, time spent on learning is the critical factor because different people learn at different paces. In order to progress at one's own speed, one needs individualized formative assessments and correctives with sufficient time to achieve the defined learning outcome (Lengetti et al., 2020, and references therein).

Another characteristic of mastery learning is that the learner must master a given basic level before entering a higher level on their learning journey. If the learners do not master a given test, they will receive additional support until they master the given level. This support by the educator is critical and underlines the shared responsibility between the learner and educator on the learning progression. Hence, the elements of mastery learning progress from goal setting via formative feedback and corrective actions until mastery is achieved (Lengetti et al., 2020, and references therein).

To be able to reach a mastery level, some definition of what mastery is, is needed. Oftentimes this is done by setting some standards or creating what is called a minimum passing standard (Yudkowsky et al., 2015). These standards are scores that create a boundary of what is good enough and what is not (Norcini, 2003). The intention is to set the limit of what it takes to master a given skill, or better, a given learning outcome. From this, we see that a mastery learning approach ensures that all learners are prepared to succeed in the subsequent stages of their learning journey (Yudkowsky et al., 2015). This aligns with the RCDP where the repetitions performed during a simulation correspond to the repetitions and feedback that ultimately leads to mastery (Eppich et al., 2015). Standards can be normative or criterion-based, the latter normally using specific standard-setting procedures. More on this in the publications by Yudkowsky et al. (2015) and Norcini (2003).

Other relevant pedagogical theories

The idea of radical behaviorism, i.e., the stimuli-response interaction, is logically connected to the concept of feedback. Constructive feedback can change behaviors, as is key in the learning of practical skills. During the short time-outs during RCDP, it is unavoidable that direct feedback is given. For example, if the facilitator observes that hygienic standards are not being followed during the scenario, the simulation can be stopped, feedback given, and the learners can immediately change their behavior and do that given part of the scenario again. By this, there is an immediate change for the better and such an improvement does not need to be discussed or reflected upon. Constructive and structured feedback is potentially all that is needed.

Social constructivism is a subset of the bigger philosophical and psychological theory of constructivism which focuses on how the learner actively constructs knowledge and meaning through experience, interaction, and reflection upon the world. The Social constructivism subset underlines the value and role of the individual learners by working together with others in groups in contexts. As with most simulation education and training, RCDP is closely connected to learning in groups.

In view of the description above, one can see how the notion of Communities of Practice (Wenger, 1998) fits nicely within the frame of social constructivist learning and RCDP. A community of practice is a group of individuals with the following characteristics:

- Mutual Engagement: Firstly, through participation in the community, members establish norms and build collaborative relationships; this is termed mutual engagement.
- Joint Enterprise: Secondly, through their interactions, they create a shared understanding of what binds them together; this is termed the joint enterprise.
- Shared Repertoire: Finally, as part of its practice, the community produces a set of communal resources, which is termed their shared repertoire.

These characteristics help build and reinforce the group and the professional identity and the simulation activities thus mirror the work-life of the participants.

Experiential learning is based on the concept that knowledge is gained through personal as well as environmental experiences. It is also described as a theory of learning through reflection and doing. The learners need to be able to reflect on their experience, conceptualize it through analytic skills and ultimately be able to use their experience to make decisions and solve challenges. The learners play an active role in their own learning. At the core of this theory is Kolb's experiential learning cycle. This theory speaks directly to RCDP, as reflections and consecutively changed behavior based on decision making is at the core of RCDP.

Other educational concepts embedded into the RCDP include contextualization, formative assessment, scaffolding and observable learning outcomes. These are well presented in the review by Perretta et al. (2020).

Research

The aim of this text is not to dig deep into all research of RCDP, but rather to give a brief overview of relevant and enlightening research being done supporting the RCDP as a good simulation methodology. As a reader we urge you to dig deeper into the most relevant of these publications to better understand the details and the methods underlying the results. RCDP as a methodology has been studied mostly on skills performance, but as described below, also on teamwork and on staff.

The principle of RCDP is not new however, the RCDP wording was introduced with the publication by Hunt et al. in 2014. Hunt and co-workers published a pre- and post- RCDP-intervention study focusing on rapid acquisition of procedural and teamwork skills on pediatric resuscitation. They found that implementation of RCDP led to faster start-up of chest compressions, and they were more likely to initiate defibrillation within 2 minutes compared to pre-intervention. This study is supported by another report on neonatal resuscitation where Magee et al. (2018) found that following RCDP interns had improved abilities and decreased time to perform critical interventions in neonatal resuscitation simulation compared to those trained with the traditional simulation with debriefing. However, in this study RCDP was not found to be superior in improving confidence or retention. Gross et al. (2019) published a randomized controlled single-blinded study on pediatric intubations where they tested whether RCDP with real-time feedback and the opportunity to repeat the action, was superior to a simulation setting where feedback was not given during, but rather after the simulation. The primary outcome was the improvement in intubation choreography. Participants receiving RCDP training achieved a significantly higher score improvement than the control group. However, there was no significant difference between the two groups for endotracheal tube placement success. The study suggests that RCDP is an effective method to teach procedural choreography and could be an appropriate method for debriefing learners in procedural skills training. In a study by Yan et al. (2020) RCDP was found to improve junior surgical residents' confidence, and the majority of the learners stated that the RCDP sessions positively impacted their clinical performance.

Contrary to the results presented above, Blancard et al. (2021) did not find any difference between a RCDP intervention and a traditional education approach including traditional simulation when scoring an individual emergency cardiovascular care and communication simulation. In fact, the traditional education attendees reported higher levels of self-confidence and satisfaction in numerous areas. The same was the case in the study by Rosman et al. (2019). RCDP and traditional simulation were studied on pediatric resuscitation skills, and no differences were detected on pre-and post-test performances or self-confidence scores. Hence, RCDP is not, as commonly seen in research, unambiguously better than what it is compared to.

In a pilot study by Lemke and co-workers (2019) RCDP and traditional simulation-based medical education including debriefing was compared for resuscitation cases with pre-test and post-test. In this study, the medical objectives were divided and sequenced into progressively harder rounds, i.e., each round added more steps of the resuscitation algorithm. Hence, for the RCDP cases, they were made of a series of rounds, each more difficult than the previous, following a mastery learning flow of the training. The last and most complex RCDP round in each case was identical to the traditional case. Scoring the team performance, this study showed a trend toward greater improvement in team performance and significantly greater improvement for human factors (e.g. closed-loop communication, mutual respect and role establishments) using the RCDP approach compared to the traditional simulation approach. Van Ittersum & Estephan (2021) used RCDP in an intensive care unit to train interprofessional teams not used to working together. With the need for an extended prebriefing to ensure the safe learning environment, the authors concluded that RCDP was "an ideal model in which to deliver this education".

At Winthrop University Hospital, the mandatory nursing education day was relocated from a classroom to a new simulation centre in 2014. In addition to the relocation, the economic situation also demanded a reduction of time for simulation, from 4 to 2 hours. Hence, innovative solutions were needed with RCDP being among those chosen. Kutzin & Janicke (2015) reported in their publication that "taking RCDP into use for the mandatory education day training dramatically improved the care of cardiac arrest patients. Importantly, the improvement was seen in spite of the reduction of time for simulation training". In a study of faculty, RCDP was found to be preferred by new trainees, whereas the more traditional simulation with an uninterrupted scenario followed by debriefing was preferred by the more experienced staff (Hodgson et al., 2017).

In 2017, Taras and Everett published a review article on the topic of RCDP. The review summarizes the research published at the time, and they concluded that the available information about RCDP were both limited and inconsistent, and that there was a lack of data beyond pediatrics and adult resuscitation scenarios. As we have presented above, later studies have now shown that RCDP is a useful method in other simulation settings as well. Also, RCDP as a methodology, is perceived as a beneficial learning methodology, as it helps to gain confidence and critical thinking (Patricia et al., 2017). Interestingly, RCDP is also found to be a useful simulation methodology when facilitators and students are apart, as seen during the Covid-19 pandemic (Balmaks et al., 2020). The study by Taras and Everett is worth reading to have a broader view on the topic.

In 2020 Perretta and co-workers published a review and best practice article on RCDP. A lot of interesting aspects of RCDP are presented (it is freely available, see reference list). Reading this report will provide further and beneficial understanding than us replicating the author's discussions. However, there are two issues we would like to comment on. Firstly, they point at several variables of RCDP that seem to be fluctuating or not being present at all in previous studies. These include learner group size, subsequent scenario difficulty, and gap analysis scenario. This indicates both how RCDP first was thought of and how RCDP is being used in different academic environments. RCDP is not understood as a single method among academics, but rather as a method that does have some flexibility. The latter can, from a development point of view, add value to the RCDP as a learning method, as new opportunities might be easier to identify.

Secondly, Perretta et al. (2020) present future directions on what could be explored within RCDP, most notably regarding debriefing style, with attention to i) the role of feedback, ii) instructor and learner fatigue, iii) ideal placement and spacing, and iv) long-time performance. Hence, there is a lot we do not know about RCDP today as well as a lot of variables to explore. This leads us to our exploration based on the RCDP model.

Future Opportunities of Rapid-Cycle Deliberate Practice

The fact that different academic environments use the RCDP approach differently, as presented by Perretta et al. (2020), teaches us valuable and less valuable ways of running RCDP. Such shared knowledge helps us all to find new ways and new approaches when looking for improvements. The RCDP model used by Hunt et al. (2014) suggest that the learners first go through the whole scenario uninterrupted and then, during the second round, have time-outs and repetition is encouraged. Conversely, several of the other research studies done have not used this gap analysis approach. This is valuable, because by doing minor changes of a defined educational "procedure", one can harvest new information that ultimately can contribute to finding new or updated educational methods.

Most simulation education and training is being run with a facilitator. Hence, simulation is highly expert dependent (figure 3). With the challenges ahead including: i) the need to educate more healthcare workers in the future, ii) the need for healthcare workers to constantly be updated on new and updated clinical procedures, iii) the clinical transition, where newly educated health care workers do not feel skilled enough to enter the clinic iv) the lack of time to simulate, v) the lack of trained facilitators and not to forget, vi) the increasing focus on competency and outputs of education and training (and less on "been there-done that"), there is a need to re-think how we plan and run simulation education and training for the future.

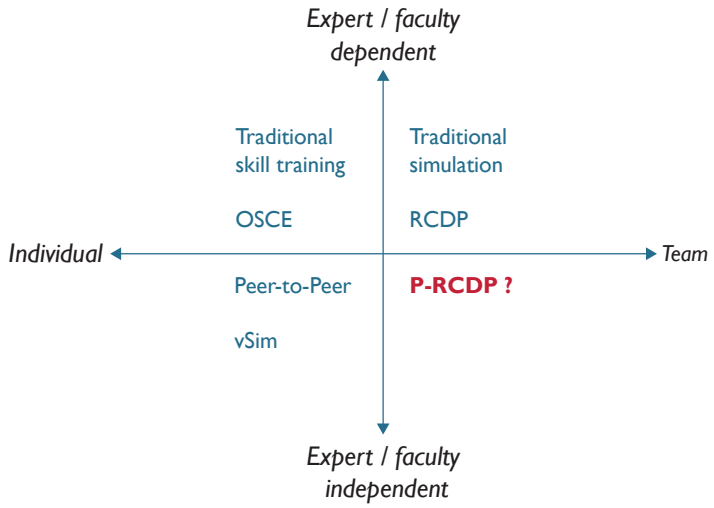

Figure 3: The figure is illustrating how established (blue) simulation methodologies can be categorized along the axis of team – individual training, and expert – expert independent training. The challenge is whether the open gap of team-based simulation independent of the expert can be closed by the P-RCDP developed by SAFER and Laerdal Medical. OSCE = Objective Structured Clinical Examination. P-RCDP = Peer-based RCDP.

In this section we will present some ideas of how one can benefit from the RCDP methodology in developing new and improved simulation methods to mitigate the challenges described above.

One approach we might see in the future is the use of artificial intelligence and how a digital solution, including a smartphone camera, can detect the activity that is going on. Together with a predefined checklist, one can imagine that the digital solution can capture the relevant data, trigger the time-outs, and give feedback based on what is just done. Furthermore, one can imagine that the system can create a log for each learner, so any user of the system, e.g., a facilitator or learner, can view a personalized log and progression plan based on how the individual learners are mastering different RCDP scenarios. This way of adaptive learning will create a completely different way of improving, tracking, and documenting the student or professionals' competence development. The AI-generated data and insights can assist facilitators in doing the RCDP time-outs, making it possible for non-educated instructors or peers to take the role of a facilitator. But this belongs to the future, yet a future not too far away.

In 2021, an initiative to adapt the existing RCDP to new insights from peer-to-peer solutions was initiated at Laerdal Medical together with SAFER. This initiative was partly based on our experience with the peer-to-peer concept (White Paper to be found here: https://laerdal.com/us/learn/resource-library/?ContentType=White+Paper), and our exploration to find a simulation model where the learners can work in teams independent of an in person expert / facilitator (see figure 3). Our approach was to try to combine the opportunities we find in the peer-to-peer concept, with the RCDP model. We call this model Peer-based RCDP (P-RCDP, see overview in figure 4). This new concept has been piloted initially on four different groups: Paramedic trainees, paramedic BSc students, professional midwifes and nurses and health care assistants working in a nursing home. The learnings from these pilots are presented in table 1.

For our pilots we created relevant scenarios for the given target audience, e.g. a CPR and a sepsis scenario for paramedics trainees, and predefined the time-outs in the scenarios. To these time-outs we created a list of expectations of what an experienced worker should have done. The time-outs were identified to for example 3, 6, and 9 minutes (figure 4), depending on the nature of the scenario. The idea was then to record a video for each of these time-outs where a professional would tell the learners what is to be expected from an experienced perspective. This video feedback would then act as the foundation for a quick reflection among the learners,

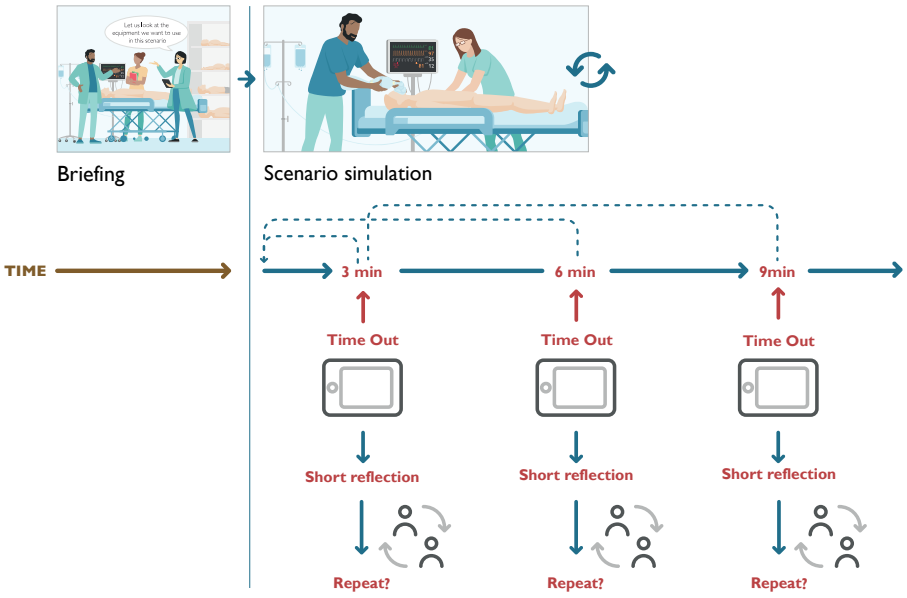

Figure 4: Overview of the P-RCDP model used during pilot characterized by time-outs, video feedback, peer-to-peer reflection, and repetition. Note that the 3, 6, and 9 minutes time-outs are examples. Our learning is that time-outs need to be set according to the nature of the scenario. Also, note that repeating in our pilots was most often back to start, but this needs to be reconsidered and studied more. Our learning indicates that the repeating can also be back to the previous time-out. This also needs to be further explored.

including one observer, who is keeping time and controlling the flow of the simulation. Also, the observer would possess a set of questions for the group to follow up the quick reflection. The learners would reflect on what they could have done differently, and the last question could be: "is this [the changes they see they could have done] critical for the patient?". If, yes, the learners need to start from the beginning and improve. If no, they can still choose to repeat. The goal is always to have the learners repeat and improve, several times if needed or desired.

Pilot group	Learnings
Paramedic trainees (n = 8-9)	• The method was found to be very valuable • During the time-out's, detailed feedback was key. Feedback triggered reflection. • The observer was valuable for presenting time-out questions and to contribute to the reflections • The skeptical teacher was – after the first day – very positive and wanted to implement this at all ambulance stations in the region.
Paramedic BSc students (n =12)	• The method was found to be valuable • During the time-outs, clear feedback was key. • The time-out with optional repetitions was found valuable • The students were positive to use this as a training method without a teacher when the scenarios are quality assured with the curriculum and learning progression.
Midwife team (n = 3)	• The method was found to be valuable, but also challenging due to the short scenario • The method might be useful as a supplementary method, but the need of facilitator seemed to be critical • The method might be most useful for medical staff in training. • Detailed feedback was not triggering reflections, but open questions did.
Nursing home employees (Nurses and healthcare assistants)	• The method was appreciated • They saw good value in time-outs and the immediate reflections and repetitions • The timings were less relevant, i.e., they did not normally operate with such short time "deadlines" as the training invited to • The scenarios did not adapt to the fact that they normally know their patients and how they react in different situations.

Table 1: The learnings from the initial pilots with P-RCDP.

Based on these initial pilots and dialogues with other professionals, we see some direct opportunities and some needs for further explorations with P-RCDP. The clearest opportunity we see is in the paramedical / EMS segment. This is because of their focus on procedural training where P-RCDP can be a very good supplement to their other methods. Therefore, the next steps for 2022 and 2023 is to develop a paramedic P-RCDP solution for some of our selected markets. Also, as we now are learning more of how P-RCDP can additionally fit professional nurses, we need to continue to explore the potential of P-RDCP with professional and student nurses.

P-RCDP and the Circle of Learning

In the introduction defining RCDP, it was briefly mentioned that one of the characteristics of RCDP is "that learners will have repeated several steps of the scenario up to several times" and that this is "critical for drilling motoric skills as well as decision making". "Skills" and "decision making" represents two of the segments in the Circle of Learning (CoL, figure 5).

The CoL describes a process to acquire and improve desired competence and how it needs to transfer into clinical practice to improve quality of care. It also describes approaches to achieving educational efficiency by devising a natural progression from individual, cognitive learning; through skills training; towards team-based learning models, and alignment with clinical best practices. From the perspective of improving the quality of care given, the CoL suggests applying metrics which lend themselves to measurement (actionable insights).

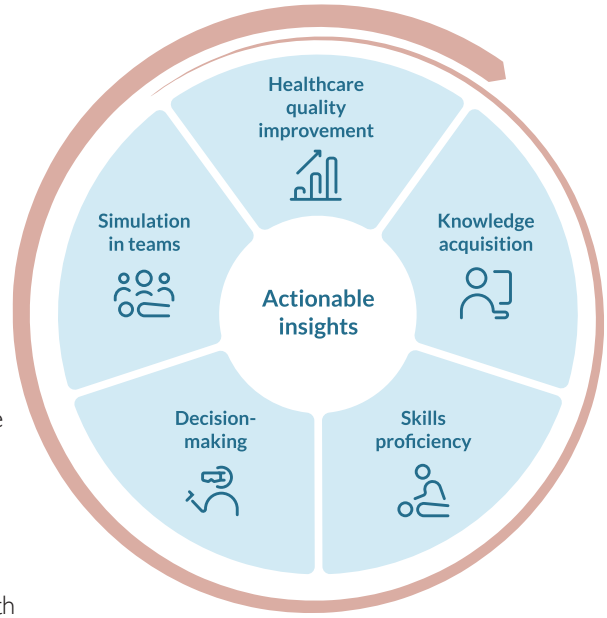

Figure 5: The Circle of Learning.

We believe that training by the RCDP model fits well particularly into scenarios focusing on skills proficiency and decision-making. This is because both skill and decision training can easily lean on feedback for improvement and might need fewer, deep reflections. This is also well within how we experience the P-RCDP work. Hence, there is a good fit here. P-RCDP may therefore be a valuable addition to other simulation methodologies, particularly because of the way decision-making is handled or addressed in real time. Confronting these challenges provides learning benefits for participants and peers, an aspect that is not covered that well in the more traditional simulation methods. We will not exclude the possibility that P-RCDP is relevant for the simulation in teams' segment also, but this might need to be validated based on more experiences with this approach.

How to get started with P-RCDP

P-RCDP is a concept that is still under exploration and conceptualization. The "explore activities" stage relates mostly to where this method may fit and add value, whereas the "conceptualization" is on how to run the P-RCDP. As of now, we are in the "conceptualization" phase when it comes to P-RCDP for paramedics, but more on "explore activities" for other professions.

During 2022, we discovered interest in RCDP and P-RCDP in Sweden. At the time of this writing, several, Swedish organizations are considering taking these concepts into action. In June 2022, two webinars were delivered to the Swedish audience, where an introduction on "how to get started with P-RCDP" was presented. The same "template" is given here, but as the reader you need to be fully aware that "P-RCDP as a concept" is just that, still a concept under development. Hence, new knowledge will be harvested, new ideas will come to mind, and more testing will be done. Further discovery may necessitate an update to this section. Please, have that in mind when you read further.

If you are considering testing out the P-RCDP, we suggest adhering to the following structure:

1. **Identify a well-defined scenario with few learning outcomes.**
   a. A procedure related scenario might be the best start. Begin where the learning outcome is connected to an acknowledged standard or procedure.
   b. Start with the small. Initiate with something simple and then add on more complexity along the conceptualization course.
   c. Do not use more than two learners in the scenario. A third observer that can participate in the time-out discussion is highly valuable.

2. **Dissect the scenario into meaningful segments.**
   a. With this we mean that you identify "normal" or expected "breaks" or times slots when something should have happened.
   b. Identify the time slots for each of these segments, i.e., what to be expected of the learners when they have reached a given point.

3. **Identify what should have been done in each segment.**
   a. Note that your learners will not achieve this in the beginning but should have this as a goal shortly with some rehearsing.
   b. Write down these expectations in short and concise sentences. Consider having them recorded by a relevant educator with whom the learners can relate.

4. **Create a set of generic questions for the time-outs**
   a. We suggest that you add a set of generic questions for the learners to work with during the brief time-outs.
   b. We have been using the following questions:
      i. Based on the feedback you just got, where are you at?
      ii. What can you do differently to improve?
      iii. Are these changes critical for the patients?

5. Pilot your scenario in iterations

a. Remember that the faculty or educator do not play a part. The only role might be to deliver the prebrief and read the feedbacks. Both duties can be handled by the observer, as well.
b. Test out the time slots. Can you change them to the benefit for your learners?
c. Test out the role of the observer. Can they do the prebrief and handle the feedback? Is it valuable to add more observers?
d. Expand the complexity of your scenarios by:
    i. Adding more learning outcomes
    ii. Adding more learners
e. Interview your learners and make sure you understand their take on the methodology and their learning potential. Afterwards adapt your P-RCDP accordingly.

Don't hesitate to reach out to the authors of this White Paper for support or for sharing and discussing your knowledge.

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