The 3D Model of Debriefing: Defusing, Discovering, and Deepening

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The experiential learning process involves participation in key experiences and analysis of those experiences. In health care, these experiences can occur through high-fidelity simulation or in the actual clinical setting. The most important component of this process is the postexperience analysis or debriefing. During the debriefing, individuals must reflect upon the experience, identify the mental models that led to behaviors or cognitive processes, and then build or enhance new mental models to be used in future experiences. On the basis of adult learning theory, the Kolb Experiential Learning Cycle, and the Learning Outcomes Model, we structured a framework for facilitators of debriefings entitled “the 3D Model of Debriefing: Defusing, Discovering, and Deepening.” It incorporates common phases prevalent in the debriefing literature, including description of and reactions to the experience, analysis of behaviors, and application or synthesis of new knowledge into clinical practice. It can be used to enhance learning after real or simulated events.

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The key components of simulation-based learning in health care are the simulated experiences and subsequent “post-experience analysis” or debriefing.1 Simulation alone will not facilitate learning; rather, it provides opportunity for learning if debriefed skillfully. This feedback on the simulation is the most important component of simulation-based education.2,6 For learning to take place, individuals must actively reflect upon the experience, identify the mental models that led to behaviors or cognitive processes, and then build or enhance new mental models to be used in future experiences.7-10

Debriefing has historically been practiced in the military to recap events and strategize for future events, in psychology to inform participants after deception studies, and after critical incidents to reduce stress.5,11-13 However, a paucity of literature exists in the educational arena on debriefing with the goal of learning from an experience.14 We report on a framework to facilitate learning from experience (simulated or real) entitled the 3D Model of Debriefing: Defusing, Discovering and Deepening. The 3D Model is a process based on common phases prevalent in the debriefing literature and taught at the Institute for Medical Simulation, Cambridge, MA, including description of and reactions to the experience, analysis of behaviors, and application or synthesis of new knowledge into clinical practice. It incorporates widely accepted debriefing facilitation strategies from health care simulation, aviation, and psychology.5,14-16 This model is based on strong adult learning theory and facilitates all aspects of the Experiential Learning Cycle and the Learning Outcomes Model (Fig. 1, Table 1).9,17,18 The goal of the 3D Model is to help debriefers facilitate learning to improve daily practice and patient outcomes.

For learning to be effective and ultimately change practice, educators must consider the immersive relationship that exists between learning and factors related to: the individual learner, the learning experience, and the environment in which learning occurs (Fig. 1, Table 1).19 Key attributes of each component related to the 3D Model of Debriefing are described to follow.

The Individual

In health care simulation, adults are the learners. According to adult learning theory, there are several key differences to consider between adults and children and how they learn: (1) Adults are self-regulated meaning that they decide what and
when they want and need to learn. \( \text{20} \) (2) adult learners are intrinsically motivated, often by their self-efficacy or their belief in their ability to complete a task, their feelings of competence and their psychological safety. \( \text{21–23} \) (3) adult learners have prior knowledge and experience that form mental models that guide behavior and cognitive processing. \( \text{8,9,17,24} \) and (4) adults use analogical reasoning in learning and practice. \( \text{18,25,26} \) For this work, the individual is referred to as the participant or learner.

### The Experience

Kolb’s Experiential Learning Cycle suggests that active participation or having a “concrete experience” is an important factor in effective learning. \( \text{9} \) This experience should be considered alongside one’s previous experience and connections must be made to future experiences. \( \text{7} \) These connections can be discussed in a postexperience debriefing. For the debriefing to be fruitful, the experience must be based on learning objectives that are practical, useful for the individual, and relevant to practice. In addition, the experience should have an impact, ie, adequately challenge the participants or invoke emotion. \( \text{4,5,27} \)

### Environment

Educators must consider both the learning environment and the larger clinical environment to promote effective learning. The learning environment, ie, the classroom or laboratory setting, should be a place where the adult, self-regulated, intrinsically motivated individual feels safe to practice, experiment and discuss openly and honestly. \( \text{5,20,26,29} \) In addition, educators must consider the larger clinical environment and how it affects new learning, experimentation, and sustained practice change. For the purposes of this work, we will refer to the learning environment as the microenvironment and the clinical environment as the macroenvironment.

### The 3D Model

The 3D Model (Table 2) is designed to address the individual, the experience and both the micro- and macro-environments. The model has 3 distinct parts: Defusing, Discovering and Deepening and is preceded by a Pre-briefing or introduction to the process and ends with a Summary of lessons learned. The Pre-briefing outlines the ground rules for the debriefing session and sets the stage for learning in the microenvironment. \( \text{6,14,30} \) Defusing is designed to help the individual voice the impact of the experience and clarify the events so that they are ready for reflection. \( \text{5,6,14–16} \) Discovering facilitates “reflective observation” and “abstract conceptualization” (AC) of the experience to help the learner developmental models that can be tested during “active experimentation.” \( \text{9} \) Deepening helps the learner connect new learning to potential changes in practice within a greater context, ie, the macro-environment. \( \text{14,15} \) Finally, a brief Summary of key objectives and lessons learned closes the debriefing. \( \text{30} \)

### Setting the Learning Microenvironment

The first step in facilitating effective adult learning is creating a microenvironment that supports learning. This environment should be established at the beginning of a simulation-based course or even before the course day with a written description of goals and expectations. Adult learners must feel that the environment is safe and focused primarily on learning before they will be able to actively reflect on and share their experiences with others. \( \text{3,28} \) To achieve this, facilitators should clearly articulate that the goals of the session are self-reflection and learning, not assessment. In addition, facilitators should set the expectations for the course, including ground rules for participating in the scenarios and maintaining the confidentiality of individual performance and group discussions. Participants should be asked to engage in the “fiction contract,” ie, an informal agreement between educators and learners to commit to making the experience real and relevant. \( \text{11,32} \) The learners must understand that it is safe to make mistakes, and encouraged to honestly talk about them within the confines of the course structure.

If the goal of the course is to assess competence, the safe environment is compromised. Adult learners are less likely to talk openly about their weaknesses if they feel they are being judged. Simulation can be used as a tool for competency assessment, but assessment should occur completely separate from education or learning. Ideally, any assessment should occur at a different time from the learning opportunities and new rules specified when the simulations “change” from learning to assessment.
Pre-Briefing

As a prelude to the debriefing session, the pre-briefing should state the process for debriefing so the learner knows how to participate. McDonnell et al. describe that introduction to process increases the depth of participation among learners. Facilitators should: (1) State the general objectives of the simulation experience; (2) clarify the role of the instructor as a “facilitator of learning” who will help guide the discussion rather than a “teacher”; (3) detail expectations for participation in the debriefing, and encourage participants to be actively involved in the process by reflecting upon and analyzing performance; and (4) outline the format that the debriefing will follow.

Defusing

The Defusing phase follows the simulation and Pre-briefing; the facilitators should prompt discussion surrounding the emotional impact of the experience on the learners and the description of the event and how it unfolded. The purpose of discussing the impact and unleashing emotions is 2-fold: (1) to reduce any anxiety and stress and allow the

Table 1 3D Model Components.

<table>
<thead>
<tr>
<th>Kolb’s Experiential Learning Cycle</th>
<th>3D Model Components</th>
<th>Learning Outcomes Model</th>
</tr>
</thead>
<tbody>
<tr>
<td>Concrete experience</td>
<td>Creating a safe environment</td>
<td>Individual</td>
</tr>
<tr>
<td></td>
<td>• Introductions</td>
<td>• ... feels “safe”</td>
</tr>
<tr>
<td></td>
<td>• Ground rules and expectations</td>
<td>• ... knows what to expect</td>
</tr>
<tr>
<td></td>
<td>• Confidentiality</td>
<td>• ... is prepared to complete the task</td>
</tr>
<tr>
<td></td>
<td>• Orientation to simulation environment</td>
<td>Experience</td>
</tr>
<tr>
<td></td>
<td>Simulation exercise</td>
<td>• ... creates a change in body state for individual</td>
</tr>
<tr>
<td></td>
<td>• Define objectives</td>
<td>• ... is realistic to evoke emotion for individual</td>
</tr>
<tr>
<td></td>
<td>• Enhance realism: care-team, environment, progression</td>
<td>• ... is relevant, practical and useful to individual</td>
</tr>
<tr>
<td></td>
<td>• Challenging to invoke emotional response</td>
<td>Individual</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• ... knows what to expect</td>
</tr>
<tr>
<td>Pre-briefing</td>
<td>Ground rules</td>
<td>Environment (micro)</td>
</tr>
<tr>
<td></td>
<td>Set expectations</td>
<td>• ... is safe for learning</td>
</tr>
<tr>
<td></td>
<td>Explain format</td>
<td>Individual</td>
</tr>
<tr>
<td>Reflective observation</td>
<td>Defusing</td>
<td>• ... distresses to set stage for learning</td>
</tr>
<tr>
<td></td>
<td>• Discuss emotions</td>
<td>Individual</td>
</tr>
<tr>
<td></td>
<td>• Recap events</td>
<td>• ... engages in student-centered learning</td>
</tr>
<tr>
<td></td>
<td>• Conduct Needs Assessment</td>
<td>Individual on Experience</td>
</tr>
<tr>
<td>Discovering</td>
<td></td>
<td>• ... analyzes behaviors and intended outcomes</td>
</tr>
<tr>
<td></td>
<td>Prompt reflection through objective observation and video review</td>
<td>Individual</td>
</tr>
<tr>
<td>Abstract conceptualization</td>
<td>Discover mental models guiding behavior</td>
<td>• ... uses “analogical reasoning” to compare existing mental model to target mental model</td>
</tr>
<tr>
<td></td>
<td>Discuss target mental models</td>
<td>Individual within macroenvironment</td>
</tr>
<tr>
<td></td>
<td>Cue analogical reasoning</td>
<td>• ... mentally connects target mental model to practice use within larger clinical environment</td>
</tr>
<tr>
<td>Active experimentation</td>
<td>Deepening</td>
<td>Individual</td>
</tr>
<tr>
<td></td>
<td>Prompt individual to apply new information to practice</td>
<td>• ... leaves with practical and useful information.</td>
</tr>
<tr>
<td>Summary</td>
<td>Restate learning objectives discussed and lessons learned.</td>
<td>Individual within microenvironment</td>
</tr>
<tr>
<td>Simulation Exercise 2</td>
<td>Allow individual to apply new information</td>
<td>• ... actively connects target</td>
</tr>
</tbody>
</table>

The 3D Model of Debriefing is based on Kolb’s Experiential Learning Cycle, Adult Learning Theory, and the Learning Outcomes Model. It incorporates well-established debriefing phases and addresses the adult learner, key experiences, and the learning environment(s).
<table>
<thead>
<tr>
<th>Purpose</th>
<th>Points to Include</th>
<th>Examples</th>
</tr>
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</table>
| Prebriefing | Purpose: To explicitly state how the learners should participate in the debriefing and how you as the instructor will participate. | "My role as an instructor is not to evaluate your performance, but to help facilitate a discussion and prompt self-reflection. I expect you to do most of the talking, raise questions about what was going on, identify issues, and volunteer your perspectives. The format of the discussion is as follows: we are going to debrief in three parts. First, we will have an opportunity to talk about our emotions and the impact of the simulation. Next, we will clarify the clinical details of the scenario. During the second part, you will analyze your own performance and evaluate how well the management of those situations worked. Our goal during this phase is to discover your mental model that guided your behavior and then talk about that mental model utilizing all the experience in the room. We will then connect new learning to future clinical situations. Finally we will summarize key learning points."
| Points to Include | - Clarify your role as instructor | "My role as an instructor is not to evaluate your performance, but to help facilitate a discussion and prompt self-reflection."
| | - Detail your expectations for learner participation | I expect you to do most of the talking, raise questions about what was going on, identify issues, and volunteer your perspectives."
| | - Explain the format the debriefing will follow | The format of the discussion is as follows: we are going to debrief in three parts. First, we will have an opportunity to talk about our emotions and the impact of the simulation. Next, we will clarify the clinical details of the scenario. During the second part, you will analyze your own performance and evaluate how well the management of those situations worked. Our goal during this phase is to discover your mental model that guided your behavior and then talk about that mental model utilizing all the experience in the room. We will then connect new learning to future clinical situations. Finally we will summarize key learning points."
| | - Tell the learners how long the session will last. | "I expect you to do most of the talking, raise questions about what was going on, identify issues, and volunteer your perspectives."
| | | The format of the discussion is as follows: we are going to debrief in three parts. First, we will have an opportunity to talk about our emotions and the impact of the simulation. Next, we will clarify the clinical details of the scenario. During the second part, you will analyze your own performance and evaluate how well the management of those situations worked. Our goal during this phase is to discover your mental model that guided your behavior and then talk about that mental model utilizing all the experience in the room. We will then connect new learning to future clinical situations. Finally we will summarize key learning points."
| Defusing | Purpose: To allow learner to “vent” emotions. To recap and clarify what happened during the scenario. To conduct a needs analysis of objectives important to the learner. | "How did it feel to be part of that scenario?"
| Points to Include | - Elicit reactions and emotions | “Thank you for bringing that up . . . . Let’s hold that thought and come back to it during the second part of the debriefing . . . .”
| | - Describe what happened | “Let’s recap WHAT happened during that scenario so that we can then discuss WHY during the second part of the debriefing.”
| Discovering | Purpose: To analyze and evaluate performance through reflection. To discover mental models or rationale for specific behaviors through Inquiry. To identify gaps/matches between existing and targeted mental models. | "Person A, I noticed that you did x in y situation."
| Points to Include | - Identify an observed behavior or outcome | I was curious about that action because . . . (instructor offers his own mental model about how to deal with y). Can you tell me why you did x?"
| | - Ask a question to discover the mental model guiding that action | “Thanks for sharing the rationale. Has anyone else every experienced this? What did you do to deal with that situation and why?”
| | - Cue Individual to make/identify analogy/connection to Target Mental Model | “Person A, how might this situation have been different if you had used that strategy”.
| Deepening | Purpose: To apply lessons from simulation and make connections to clinical practice. | "Another way to handle x is z (target mental model). If you had done z, how would that change y?”
| Points to Include | - Prompt learner to connect new learning to larger clinical environment | “If you were to encounter a similar situation in the future, how would you handle it?”
| Summary | Purpose: To review what was learned throughout the session | “How can you use the information we just discussed in your clinical practice?”
| Points to Include | - Highlight the key objectives and lessons learned | “Can you think of other situations where this information could be applied?”
| | | “Today we learned the following: . . . .”
| | | “Let’s end with this . . . . What is one thing that you can take away from this session to use in your practice?” |
learner to engage in meaningful discussion\textsuperscript{13}, and (2) to allow the facilitator to conduct a needs assessment of key points for discussion. The importance of allowing the participants to describe or recap the experience is to achieve a shared understanding of the events of the experience.\textsuperscript{15}

Defusing naturally occurs immediately after the simulation, and participants will often start this process on their own. As students leave the simulation, they may begin talking about their experience, providing insight into the feelings and the simulation provoked. The facilitator should continue this natural venting process during the Defusing phase.

To launch this part of the debriefing, facilitators should encourage participants to talk about their feelings, both during and after the experience. Every learner does not have to share their feelings, but they should be given the opportunity. If a safe environment has been set before the experience, the learner will be more likely to share their feelings. Facilitators must consciously guide the discussion to avoid analyzing the experience prematurely. For example, if a participant begins to analyze the experience before others have had the opportunity to vent their emotions, or before a description of the experience has been outlined, a facilitator might say, “Thank you for bringing up the issue of ‘x.’ This will be important to discuss, and we will come back to it during the next phase of the debriefing. However, first, I want to give the rest of the participants an opportunity to discuss their feelings.”

Asking about feelings has a powerful impact on the learners. The learners will have just been through a stressful and emotional simulation (if crafted and implemented well) and will need to de-stress by releasing emotion. Students may not be ready to learn until they discuss their feelings, as they may be too emotionally involved to think clearly or reflect objectively on their experience. The goal is to acknowledge the feelings and clear the slate for learning.\textsuperscript{13,27}

After this “venting,” it is important to allow participants to describe the experience so that everyone in the debriefing session has the same overall understanding of the series of events and can move from understanding what happened to why it happened.\textsuperscript{33} This description should be a discussion of the facts (i.e., clinical management) or a recap of the order of events. The recap can either come from participants or the facilitators. During this time, participants may reveal gaps in knowledge regarding clinical management. This is an opportunity for content experts to engage in clinical teaching.

This discussion about emotions, impact, and facts during the Defusing phase will set the tone for analysis during the Discovering phase. Facilitators must actively listen to the participants’ responses and dialogue, as they provide an assessment that highlights key issues for the learners. Individuals learn more from experiences that cause a change of body state, or a physical/emotional change. Therefore, when learners share their emotions, they reveal the moments that caused the most intense feelings (anger, anxiety, frustration, pleasure, pride) and on which they would like to focus. These moments should be considered part of the learners’ objectives for the debriefing, and can be added into the overall objectives to promote student-centered learning. This is a shift from teacher-centered learning during which the instructor identifies the learning objectives and, then, imparts knowledge or the “right way” to accomplish a task.\textsuperscript{34}

Discovering

The second phase, Discovering is based on Steinwach’s “analogy/analysis” and Kolb’s Experiential Learning Cycle.\textsuperscript{15} The goals are (1) to facilitate learners’ engagement in reflective observation on their own performance and (2) to prompt AC of new information to build or enhance one’s mental model.\textsuperscript{9} This requires the facilitator to have keen observation skills and work with the learner’s mental models to improve the practice of individuals.

During reflective observation, the facilitator provides an objective perspective on the experience to help the learner identify strengths and opportunities for improvement, specifically related to those points of emotion identified during Defusing. The facilitator needs to observe the simulation experience to identify behaviors of the individual and positive and negative outcomes of these behaviors. The participants are often unaware of these behaviors while immersed in a scenario. The video recordings of simulations can be used to enhance reflective observation by providing an objective, “third party” view during the debriefing. This triad of information, including the facilitators’ observations, the participants’ recalled experience, and the video depiction, helps facilitators to guide self-reflection. The aforementioned information is the substrate for analysis of behaviors.

This analysis is known as AC, during which learners think about the events, actions, and outcomes that occurred during the experience, they then process these ideas to enhance existing mental models that can be applied in future situations. During AC, both learner and facilitator must identify the mental model or decision-making process that led to the observed action.\textsuperscript{8,9,16}

The learner’s mental model cannot be seen; furthermore, the learner may not even be aware of the mental model that led to the action.\textsuperscript{8,16} The facilitator must maintain a stance of genuine curiosity throughout the debriefing to avoid making assumptions about the learners’ mental models.\textsuperscript{16} The facilitator must focus on identifying the learners’ mental model before any learning can occur.

The key to identifying mental models is to engage the learner in conversation. Facilitators need to delve deep into the rationale for certain behaviors through inquiry. Rudolph et al\textsuperscript{16} pioneered a tool for identifying mental models or “frames” called Advocacy/Inquiry. The tool pairs an objective observation, assertion or statement with an inquiry to probe for the etiology of individual behavior. Example: “Dr. X, I noticed that during the delivery, after the mother arrested, you did not make effort to deliver the fetus until the mother was stable. I was concerned because it is my understanding that delivery of the fetus can actually aid the resuscitation of the mother. Can you tell me why you chose to concentrate solely on the mother?” In this way, the facilitator alerts the participant of the observation (either positive or negative behavior) and assumes a stance of curiosity as to rationale.
There is then a 2-way dialogue rather than the more typical instructor-centered approach. Example: “Dr. X, during a maternal arrest, to achieve a better outcome for the mother, you need to deliver the fetus.”

Once the learner has shared their mental model, or the team has explained their shared mental model, the facilitator can then identify gaps or opportunities for learning. Identifying the gaps requires the facilitator to compare the learners’ mental model with the expected or target mental model (ie, newer evidence). If the learner uses an “old” method of treating a patient and the facilitator is looking to teach a new method, the gap is the difference in decision making or knowledge.

In the aforementioned example, Dr. X may offer his mental model: “I believe that ‘mom is first’ and no effort should be made to deliver the fetus until the mother is stable.” The facilitator should then allow time for discussion about this mental model so the individual can learn. The prior experience that exists among the group will add to the depth of the discussion. The facilitator should prompt the learner and, in fact, all learners in the group to activate their previous experience with the current topic and compare their own mental models with the target mental model (ie, delivery of the fetus aids in resuscitation of the mother and should be undertaken to save the mother’s life). Target mental models or standards of practice can be explicitly offered by the facilitator if he or she is a content expert or can be “discovered” by the group through discussion.

Once the target mental is revealed, the facilitator should prompt the learner to engage in analogical reasoning so that he/she can adapt the mental model for use in future experiences. As Bakken describes, when doctors are faced with a complex diagnosis process, they rely on their previous experiences of “cases” and “counter cases” to help the current patient. In simulation, this occurs when learners try to compare the current simulation to their previous experiences inside and outside the simulation arena. Without well-developed mental models to guide decision-making, learners often make erroneous connections, which may lead to errors. The most common error occurs when a learner makes a “surface” connection rather than a “structural” connection. This is analogous to treating the symptoms rather than the disease. The symptoms may abate in the short term but will reappear if the underlying disease is not addressed.

The process of making structural connections between a past and new patient or experience is analogical reasoning. Analogical reasoning is the process by which learners adapt their mental models to apply them to novel experiences, and improve them for future use. Facilitators should prompt participants to recall past experiences that were analogous or offer analogs that the learner can consider. For example: a facilitator can ask “how have you handled this situation in the past?” During this process of comparing, learners are expanding their mental models to incorporate new concepts.

Deepening
Deepening is an explicit connection of the learning (new or target mental model) to practice (the environment), aka synthesis. Ideally, there would be an immediate opportunity for active experimentation on an actual or simulated patient. The active experimentation that occurs in the Deepening phase is an opportunity for the learner to test out their new mental model and decide whether to keep it. Without the chance for immediate experimentation, the learner will have to attempt to retain the new information until a clinical opportunity arises. In most cases, this delay will cause the information to be lost and the learner to revert back to their old mental model.

Learners often want to repeat a simulation to try out their new mental model, especially after the Deepening discussion, and this should be encouraged. Although it may be difficult due to time and logistical constraints, learners will get more out of the simulation by having the opportunity to actively experiment with their new mental models. The second simulation should have the same structural issues as the first simulation and may even be the same simulation. Simply making small changes (ie, the name of the baby and background) to allow the learners to practice may be sufficient.

In lieu of a second simulation, Deepening can be facilitated during the debriefing by prompting the learners to connect what they just learned to actual practice. A simple strategy is to ask individuals how they can use the new strategy or information in actual practice.

At the close of the debriefing, facilitators should provide a Summary of lessons learned. This should be a brief listing of the topics that were discussed during the debriefing and solutions or target mental models that were revealed. In this way, the adult learner leaves feeling that they have learned information that is practical and useful.

Conclusions
The individual, their experiences, and both the micro- and macroenvironments must be considered to effectively achieve life-long learning. Simulation and debriefing are powerful tools to assist individuals in learning from experiences. When handled skillfully, debriefing is the most important aspect of simulation-based education, as it is where the learning and processing of new information occurs.

For adults to learn from experience in the simulated environment the individual must feel safe to explore and experiment during the experience, the experience must have an impact on the individual and highlight learning objectives that are relevant, and the individual must have the opportunity to reflect on or analyze the experience.

The 3D Model of Debriefing is a framework based upon experiential learning theory and common debriefing strategies. It offers a step-wise approach to student-centered learning. Defusing allows the learner to release emotions and describe the experience. During this phase, the facilitator should decide what issues are most important to the learner. Discovering prompts the learner to identify and analyze the mental models guiding behaviors and then compare them with new information introduced by other participants or the facilitator. During this phase, learners should be encouraged to use analogical reasoning to apply enhanced mental models.
to novel situations. During the Deepening phase, the learner cognitively applies the new information to the clinical environment. Deepening can be enhanced by a second simulation and reinforced by mentors in the macro-environment.

Although this article was written to address debriefing after simulated experiences, the 3D model can be and should be used within the macroenvironment after real events to reinforce positive behaviors and to allow learners to discover their own gaps frequently and in real-time. It is this continuous self-reflection, self-discovery and self-improvement that will ultimately lead to changes in outcomes.35

References