Fold, Reflect, and Repeat: Teaching Procedural Skills and Debriefing through Origami

Akshay Verma, Disha Arora, Justin McNish, and Olivia Li

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Challenges in Teaching Procedural Skills

TIME CONSTRAINTS

UNPREDICTABLE OPPORTUNITIES
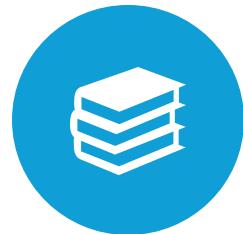
LACK OF CONTINUITY WITH LEARNER

ASSOCIATED RISK OF PROCEDURE

LACK OF EQUIPMENT

How could you teach a procedural skill?

Traditional "see one, do one, teach one" approach

Using educational theories

Vygotzky's social constructivism

Bandura's self-efficacy in learning

Schon's reflective practice

Kolb's experiential learning theory

Walker & Peyton 4 stage model
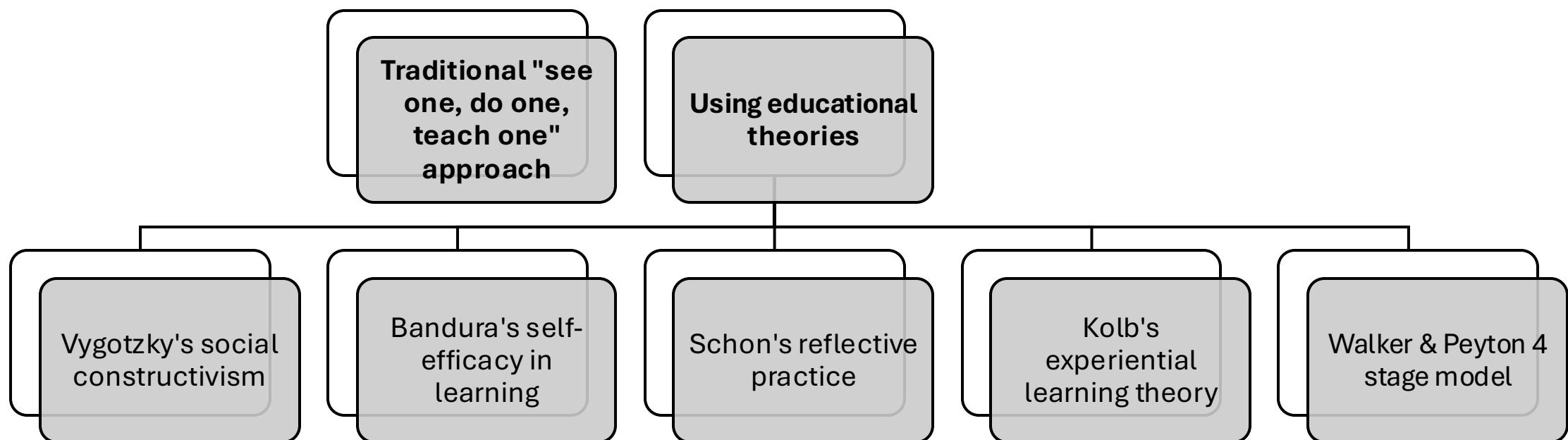
Why Kolb's?

Hands-on Learning: Direct application of procedural skills learning.

Structured Reflection: Kolb's model allows learners to cycle through active participation and reflection.

Versatility in Teaching Procedural Skills: The four learning stages align well with simulation-based medical education.

Application to Healthcare: Many medical procedures require continuous learning, practice, and reflection—Kolb's cycle mimics this process effectively.

Stage 1 – Concrete Experience

- Definition
  - Learning by feeling
  - Direct, hands-on engagement

- Examples
  - **Inserting an Intravenous (IV) Line:** medical student attempts to insert an IV for the first time. They struggle to locate the vein

  - Person attempts to bake a cake for the first time using a recipe.

Stage 2 – Reflective Observation

- Definition
  - Learning by watching
  - Looking back at an experience
  - Observe own actions or others' performances
  - Identifying and gaining insights on challenges & successes

- Examples
  - **Post-Intubation Debrief:** After a failed intubation, the team reviews a video recording. They notice the resident used excessive force, damaging the airway.

 - Cake example: Thinks, "Did I overmix the batter?

Stage 3 – Abstract Conceptualization

- Definition
  - Learning by thinking about the theory behind the experience
  - Forming theories or generalizations from reflections

- Examples
  - **Studying ECG Interpretation:** A medical student reviews cardiac anatomy and arrhythmia protocols before practicing ECG analysis.

  - Cake example: Learning - Oven temperature must stay constant

Stage 4 – Active Experimentation

- Definition
  - Learning by doing
  - Applying new ideas (based on reflection and theory) to solve problems or test hypotheses.

- Examples
  - **Simulated Code Blue:** A resident leads a mock cardiac arrest, applying ACLS protocols after studying team dynamics.

  - Cake example: Tries again, carefully whipping egg whites, sealing the oven, and setting a timer
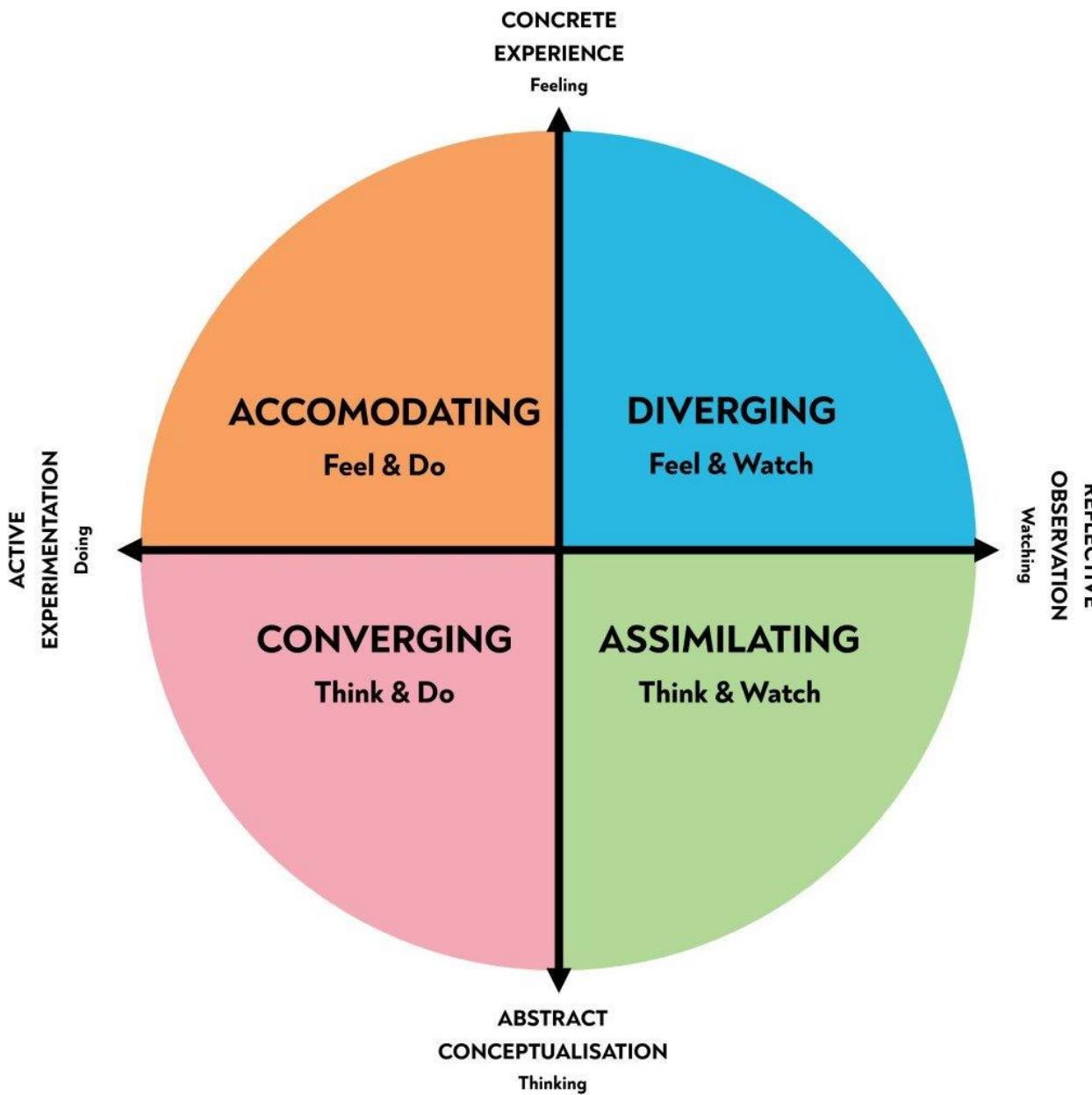
Seven Elements of the Debriefing Process

1. Debriefer
2. Participants to debrief
3. An experience (simulation scenario)
4. The impact of the experience (simulation scenario)
5. Recollection
6. Report
7. Time

Three Phases of Debriefing Models

1. Identifying impact of experience
   o Recollection and description of event in participants' own words

2. Identifying the emotions involved

3. Identifying different views of participants and generalization to real-life scenarios

Debriefing Model: DEAL

- Description
  - Describe learning experiences in an objective manner
  - What, where, when, who, how

- Examination
  - Examine learning compared to learning goals/expected outcomes
  - In what ways did you do well? In what ways were you challenged?

- Articulation of Learning
  - Acknowledge learning and establish future actions
  - What/how did you learn? Why does it matter?

Debriefing Strategy: Plus Delta

- Debriefing strategy used to reflect and assess participants' performance, individually or as a group

- What was easy? What went well?

- What was challenging? What would you do differently next time?

Debriefing Strategy: Advocacy-Inquiry

1. Observe an event or result

2. Comment on the observation & advocate for your position

3. Explore the drivers/framing behind learners' thinking and actions that they think lead to the observed event or result

Phase 1

Station 1	Trailblazers (AE) – make an origami crane using the given instructions Storytellers (RO) – watch and comment on Trailblazers' performance
Station 2	Strategists (AC) – watch the provided videos and read the provided information on origami folding
Station 3	Explorers (CE) – make an origami crane with no guidance/past experiences

Phase 2

Station 1	Strategists (AE) – make an origami crane using the given instructions Explorers (RO) – watch and comment on Strategists' performance
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Debriefing Effectively in Simulation/Procedural Skill Teaching

Debriefing

- Military training
  - Describes the account from individuals returning from a mission

- Critical incident debriefing
  - Reduces stress and accelerates normal recovery after a traumatic event in first responders

- Experimental psychology
  - Ethically required to inform participants the true nature of the study
  - Aims to explain the deception used and to reverse negative effects on research participants

Debriefing

- A reflective feedback process where learners are encouraged to discuss their strengths and weaknesses of their performance

- Critical for success in simulation learning

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Three Phases of Debriefing Models

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DEAL

- Description
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    - Examine learning compared to learning goals/expected outcomes
    - In what ways did you do well? In what ways were you challenged?

- Articulation of Learning
    - Acknowledge learning and establish future actions
    - What/how did you learn? Why does it matter?

Plus Delta: Debriefing the Emotions

- Debriefing strategy used to reflect and assess participants' performance, individually or as a group

- What was easy? What went well?

- What was challenging? What would you do differently next time?

Advocacy-Inquiry: Debriefing the Perspective

1. Observe an event or result

2. Comment on the observation & advocate for your position

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Advocacy-Inquiry: Debriefing the Perspective

Advocacy (observation, statement) :

"I noticed that you stepped away from the patient to find the bag-mask apparatus as the vital signs are deteriorating. I was thinking there were possibly alternative means to oxygenate the patient."

Inquiry (question):

"I'm curious: how were you seeing the situation at the time?"

Debriefing after an IPE simulation

- Should include representatives of all professions participating and trained simulation facilitators

  o Provide role-specific context

  o Facilitators to manage group dynamic

Debriefing after an IPE simulation

- Co-debriefing process
  - 2 or more persons facilitate the session for added context

- Two-tiered debriefing
  - Initial debrief focuses on patient care objectives unique to each profession
  - Secondary debrief focuses on interprofessional team dynamics and teamwork objectives

Role of the Facilitator

- Trained "Co-learner"
  - Not a traditional teacher
  - **The perceived skills of the debriefer** has the highest independent correlation to **the perceived overall quality** of the simulation experience

- Aims to guide and correct

- Moves participants forward from personalization to generalization
  - From "description" phase to "application" phase

Instructor-Led Debriefing

- "Gold standard" for debriefing

- Expert facilitation using video playback of performance
  - Formally trained facilitator, usually an attending physician
  - Creates an environment that is both challenging and psychologically safe

- Recruitment and training of such facilitators can be difficult and costly

Within-Team Debriefing

- Relies on peer- and self-assessment

- Boet et al. (2013)
  - Both within-team and instructor-led teams improved in their Team Emergency Assessment Measures
  - No significant effect of the debriefing type was found on the performance

- Could improve simulations' cost-effectiveness and flexibility of scheduling
  - May be used in combination with instructor-led sessions
  - Deliberate practice between formal lessons

The PEARLS Healthcare Debriefing Tool

		Objective	Task	Sample Phrases
1	Setting the Scene	Create a safe context for learning	State the goal of debriefing; articulate the basic assumption*	"Let's spend X minutes debriefing. Our goal is to improve how we work together and care for our patients." "Everyone here is intelligent and wants to improve."
2	Reactions	Explore feelings	Solicit initial reactions & emotions	"Any initial reactions?" "How are you feeling?"
3	Description	Clarify facts	Develop shared understanding of case	"Can you please share a short summary of the case?" "What was the working diagnosis? Does everyone agree?"
4	Analysis	Explore variety of performance domains	See backside of card for more details	**Preview Statement** *(Use to introduce new topic)* "At this point, I'd like to spend some time talking about [insert topic here] because [insert rationale here]" **Mini Summary** *(Use to summarize discussion of one topic)* "That was great discussion. Are there any additional comments related to [insert performance gap here]?"

Any Outstanding Issues/Concerns?

		Objective	Task	Sample Phrases
5	Application/ Summary	Identify take-aways	Learner centered	"What are some take-aways from this discussion for our clinical practice?"
			Instructor centered	"The key learning points for the case were [insert learning points here]."

The Analysis Phase

Performance Domains

The analysis phase can be used to explore a variety of performance domains:

Decision Making	Technical Skills	Communication	Resource Utilization	Leadership	Situational Awareness	Teamwork

Three Approaches

1. Learner Self-Assessment

Promote reflection by asking learners to assess their own performance

2. Focused Facilitation

Probe deeper on key aspects of performance

3. Provide Information

Teach to close clear knowledge gaps as they emerge and provide directive feedback as needed

Sample Phrases

→ What aspects were managed well and why?

→ What aspects do you want to change and why?

→ **Advocacy:** I saw [observation], I think [your point-of-view].

Inquiry: How do you see it? What were your thoughts at the time?

→ I noticed [behavior]. Next time you may want to consider [suggested behavior], because [rationale].

Variable/indication for use*	Educational Strategy During Debriefing		
	Provide information *(eg, directive feedback and/ or teaching)*	**Foster learner self-assessment** *(eg, plus-delta)*	**Facilitate a focused discussion** *(eg, advocacy-inquiry; guided team self-correction; alternatives—pros and cons)*
Variables to assess for each particular aspect of performance			
Time available	Short	Short/moderate	Moderate/long
Performance domain	Cognitive/technical	Cognitive/technical	Cognitive/behavioral (eg, teamwork, communication, clinical decision making)
Is the underlying rationale for performance gap evident?	Yes	Yes/no	No
Variables to assess before the debriefing			
Participants—level of insight	Low/moderate/high insight	Low/moderate/high insight	Moderate/high insight
Participants—level of clinical and simulation experience	Little clinical and simulation experience	Low/moderate/high clinical and simulation experience	Moderate/high clinical and simulation experience
Educator debriefing experience	Less experience required, easy to implement	Less experience required, easy to implement	More experience required, may be more difficult to implement

Does PEARLS help?

- **No statistically significant differences** in nursing students' self-reported professional competence or clinical judgment abilities between the intervention group (PEARLS) and the control group (standard debriefing).

- The use of PEARLS (a debriefing cognitive aid) may **decrease the cognitive load of debriefing**, but **did not suggest an impact on the workload or quality** of debriefing in novice debriefers.

(Høegh-Larsen et al., 2023)

(Meguerdichian et al., 2022)