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

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Learning Objectives

Experience	• Experience the components of learning a skill through reference to Kolb's Experiential Learning Cycle
Identify	• Identify different learning theories and models applicable to teaching procedural skills and simulation debriefing
Apply	• Apply the PEARLS framework to facilitate debriefing in a procedural skill-based learning scenario

The Mysterious Island of Dr. Kolb

- Welcome, adventurers! You've just arrived on an uncharted island, filled with mysteries to uncover. How will you navigate this journey? Choose the role that best reflects your natural learning style:

  - **The Explorer**
  - **The Storyteller**
  - **The Strategist**
  - **The Trailblazer**

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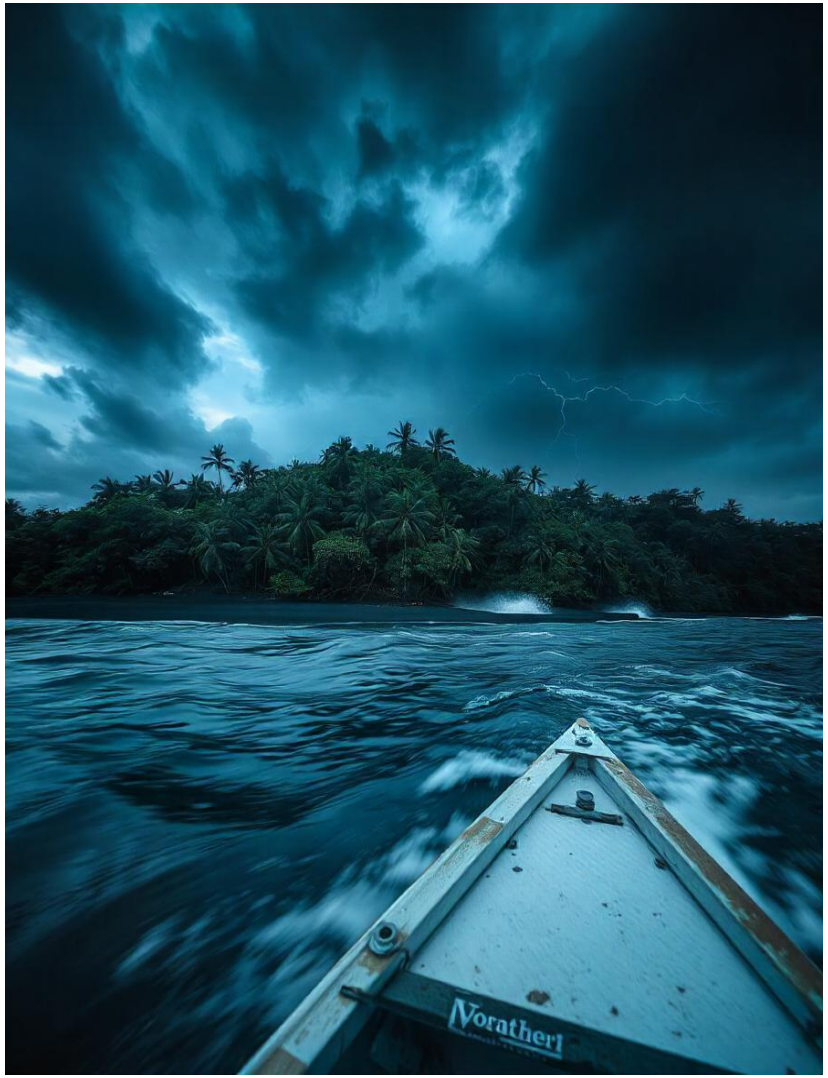
The Mysterious Island of Dr. Kolb

GROUP INTRODUCTIONS/ DISCUSSION

- Which role did you choose/receive?
- Does this reflect how you typically learn?
- Can you recall a time when you had to take on a different role?



Teaching Procedural Skills

Challenges in Teaching Procedural Skills

TIME CONSTRAINTS

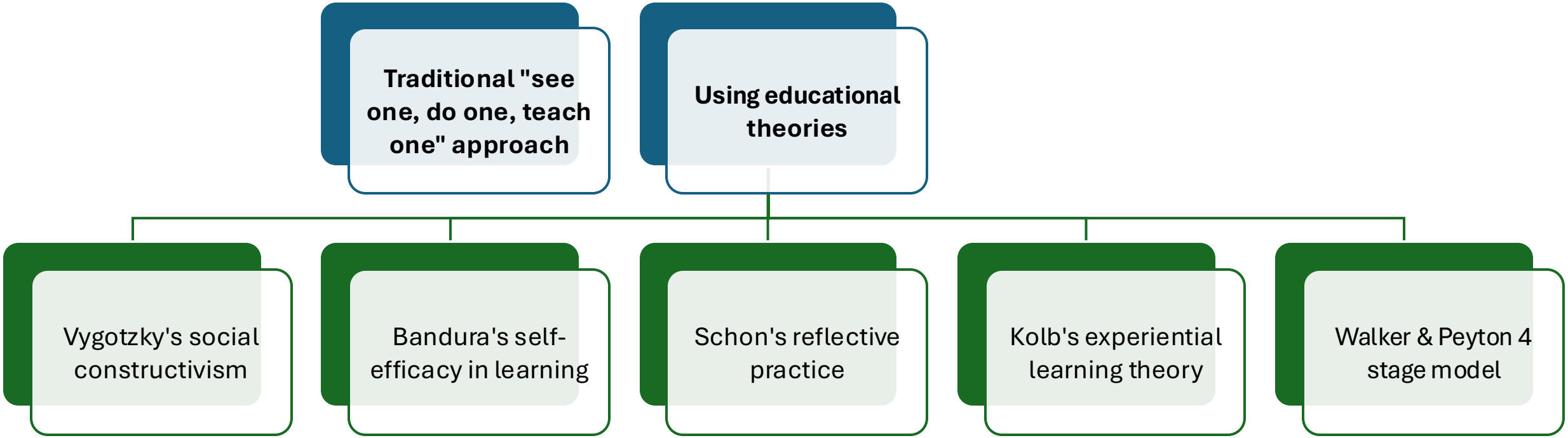
UNPREDICTABLE OPPORTUNITIES

LACK OF CONTINUITY WITH LEARNER

ASSOCIATED RISK OF PROCEDURE

LACK OF EQUIPMENT

How could you teach a procedural skill?



7 Important Principles

- Plan ahead
- Demonstrate the procedure
- Observe the learner in action and allow for practice
- Provide feedback
- Encourage learner's self-assessment
- Allow for practice under less-than-ideal conditions
- Prepare to modify your approach

Relevant Learning Theories

Vygotsky’s Social Constructivism

Pros: Scaffolding provided by teacher in ZPD

Cons: High-stakes procedures may push learner's beyond ZPD; needs adequate reflection post-procedure

Bandura’s Self-Efficacy in Learning

Pros: Potential for significant positive growth and change in learner's approach or goals

Cons: Requires highly trained effective and supportive teachers

Schön’s Reflective Practice

Pros: Adaptive decision-making; Enhanced critical thinking

Cons: Limited reflection-on-action depending on procedure

Why Kolb's?

Hands-on Learning: A direct application of procedural 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.

Traditional vs. Modern Approaches

Traditional Training	Evidence-Based Training
See one, do one, teach one	Simulation-based learning
Minimal feedback loops	Structured debriefing & feedback

Simulation

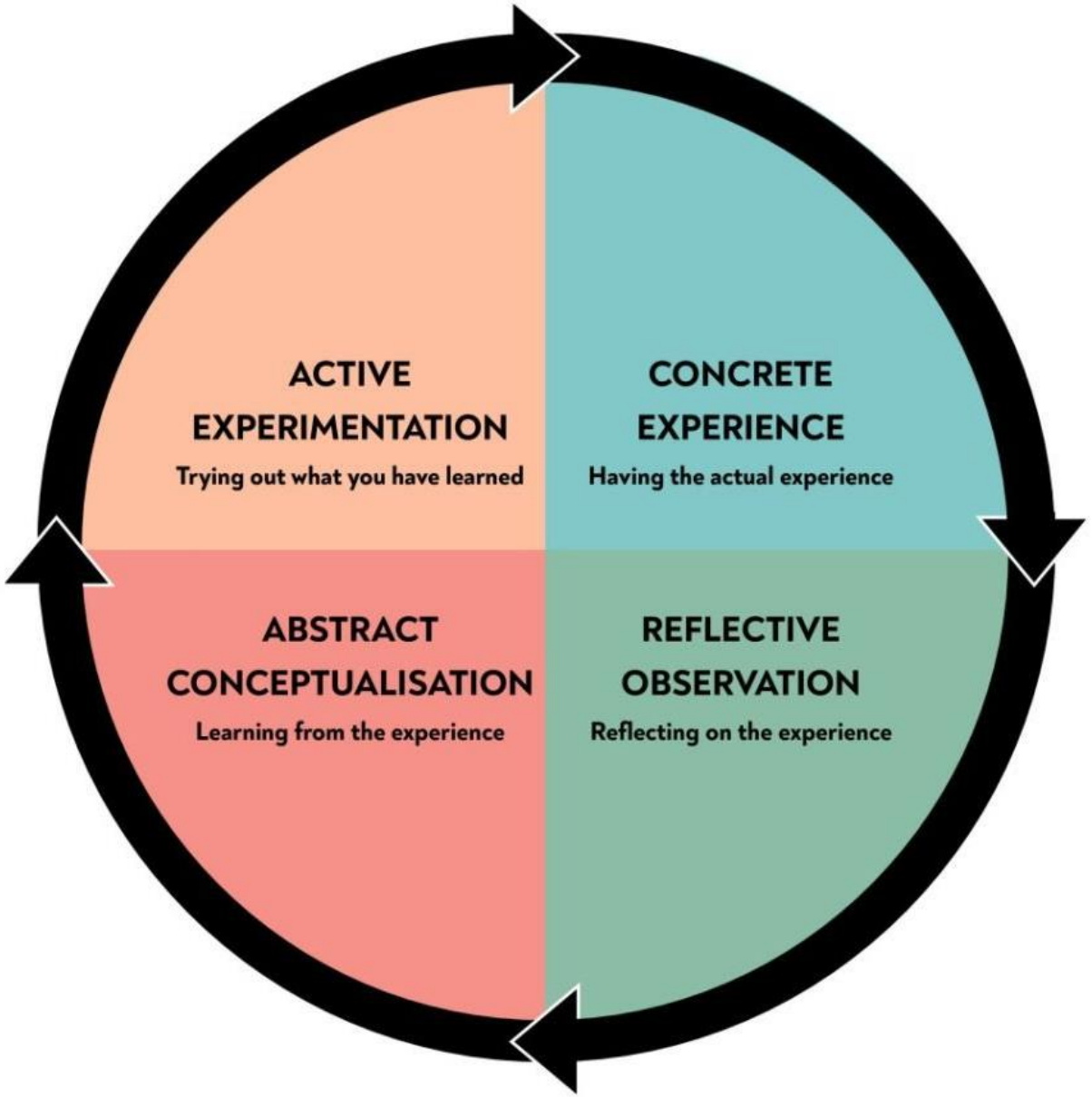
- 4 practical applications of simulation

- Low Fidelity Models
  - Less realistic
  - Still highly functional

- High Fidelity Models
  - More realistic
  - Usually preferred by learners

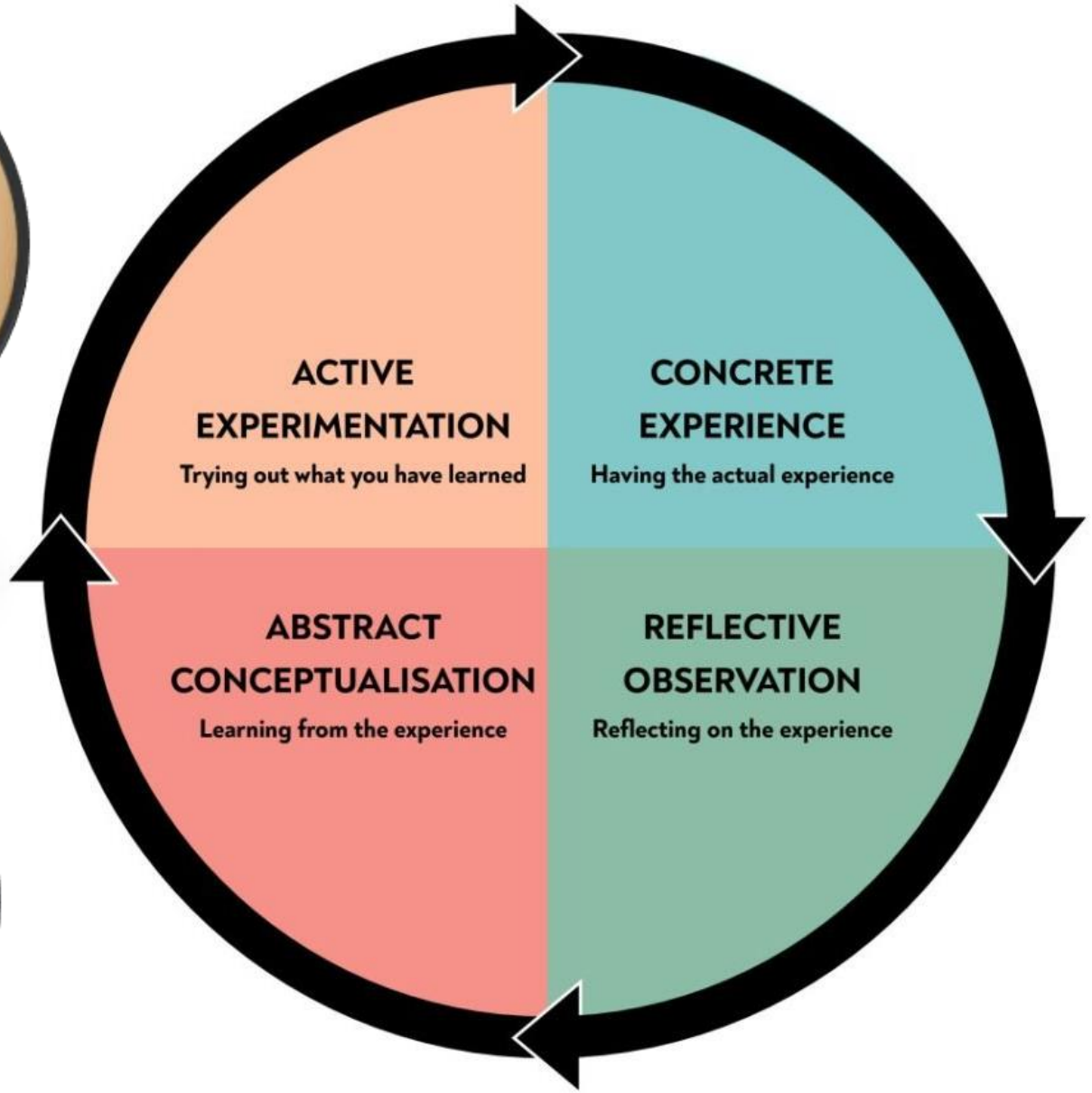
Chiniara et al. 2013

Kolb's Experiential Learning Theory



Source: www.simplypsychology.org


The Trailblazer


ACTIVE EXPERIMENTATION
Trying out what you have learned
CONCRETE EXPERIENCE
Having the actual experience
ABSTRACT CONCEPTUALISATION
Learning from the experience
REFLECTIVE OBSERVATION
Reflecting on the experience


The Explorer


The Strategist


The Storyteller

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.

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?

Abstract Conceptualization

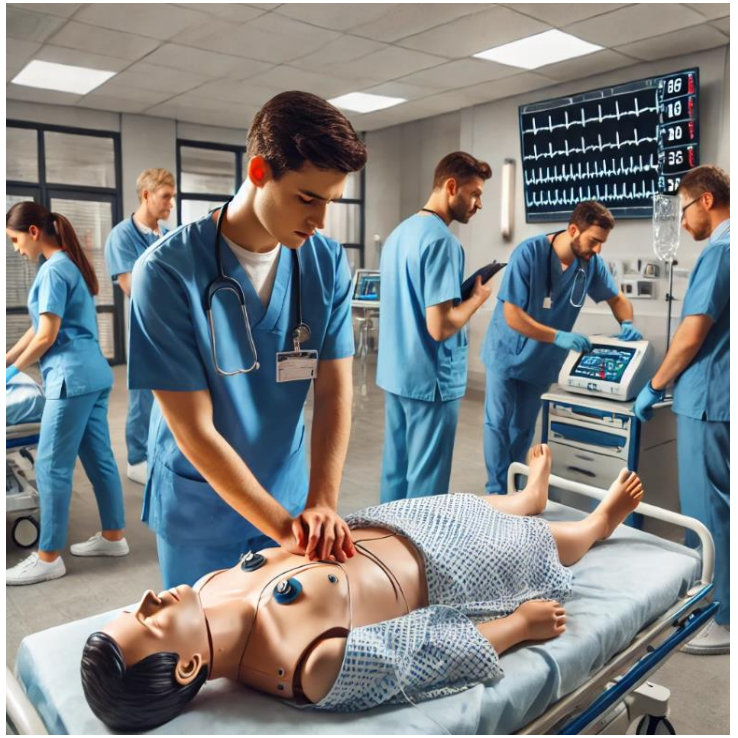
- Definition
  - Learning by thinking about the theory behind the experience
  - Forming theories or generalizations from reflections
- Examples
  - **Studying ECG Interpretation:** A medical student reviews cardiac anatomy and arrhythmia protocols before practicing ECG analysis.
  - Cake example: Read, research – learn science behind it

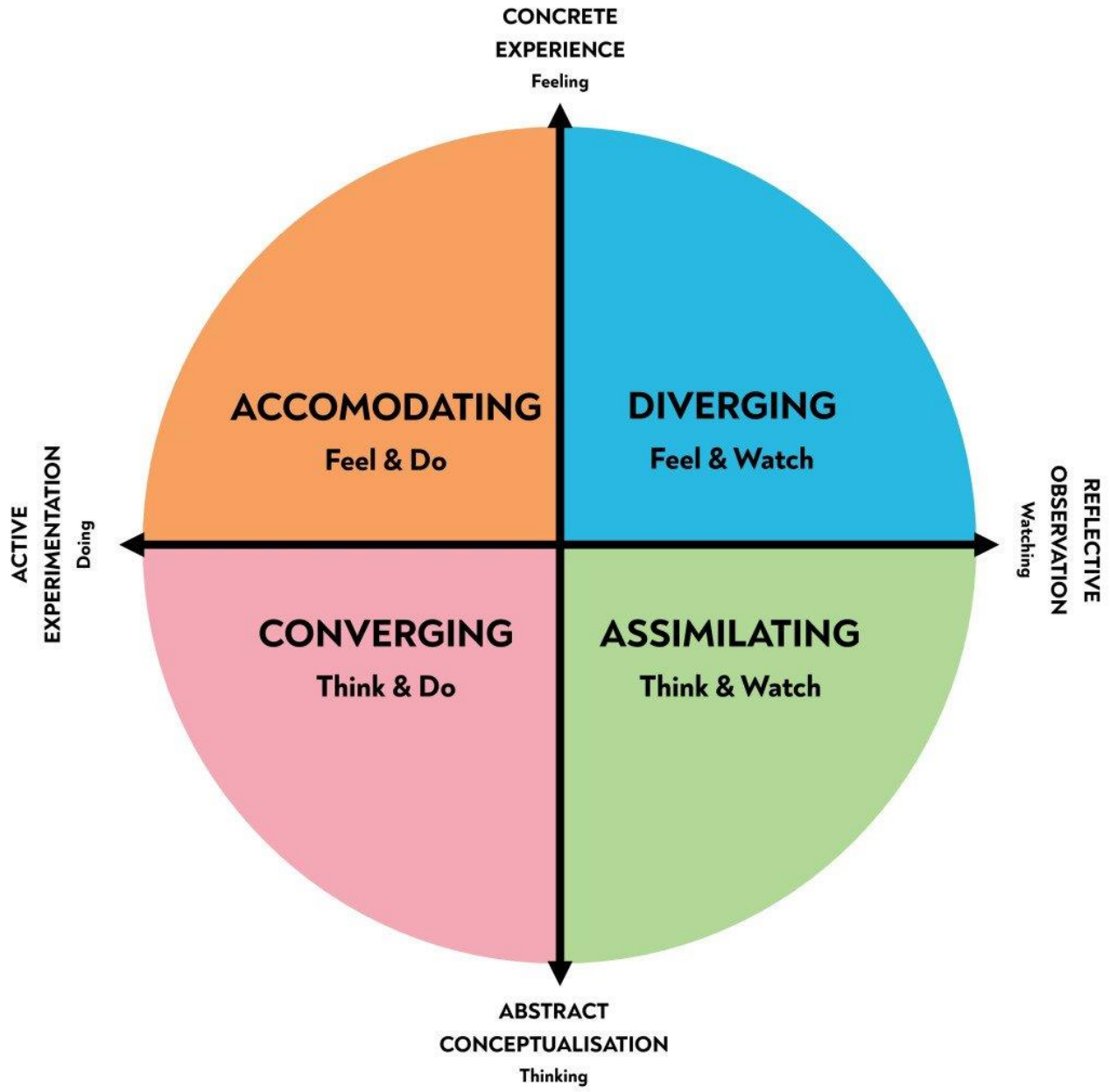
Active Experimentation

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

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

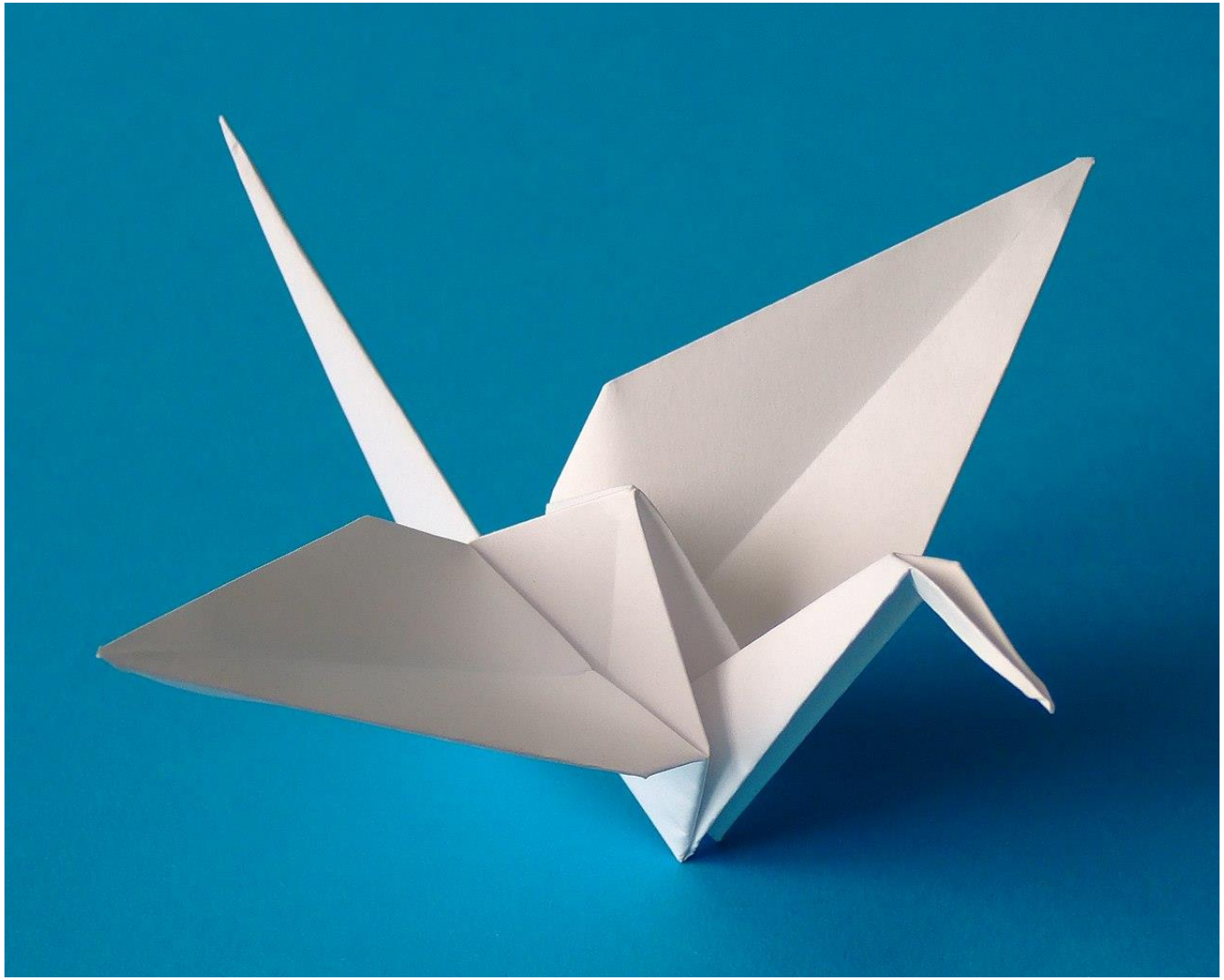
  - Cake example: Tries again, carefully whipping egg whites, sealing the oven, and setting a timer




CONCRETE
EXPERIENCE
Feeling
ACCOMODATING
Feel & Do
DIVERGING
Feel & Watch
ACTIVE
EXPERIMENTATION
Doing
REFLECTIVE
OBSERVATION
Watching
CONVERGING
Think & Do
ASSIMILATING
Think & Watch
ABSTRACT
CONCEPTUALISATION
Thinking

Break

Origami Activity



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Station 1

The Trailblazers will start folding origami given simple instructions.

The Storytellers will watch and comment on clipboards while standing around the Trailblazers.

Station 2

The Strategists will read aloud or watch video and discuss principles of effective origami folding.

Station 3

The Explorers are given origami papers to play with, using past experiences with paper folding

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 1 Debrief

🎭 Active Experimenters:

- *How did it feel to start folding origami with only simple instructions?*
- *Did you start immediately or hesitate ?*
- *What challenges did you face?*
- *If you made a mistake, did you ask for help or fix it yourself?*
- *How does this ‘trial-and-error’ approach compare to learning a procedural skill like suturing or intubation?*

Learning by doing, adapting in real time.

Phase 1 Debrief

📖 Reflective Observers:

- *“How useful was reading or watching the video before attempting the task?”*
- *“What patterns did you notice in how people approached folding? Were some strategies more effective than others?”*
- *“If you could give one piece of feedback to the Trailblazers, what would it be?”*
- *“How might observing a colleague’s technique improve your own teaching of a skill ?" “In healthcare, observing peers can reduce errors—like watching a senior resident perform a lumbar puncture.”*

Learning by observing and analyzing.

Phase 1 Debrief

Concrete Experiencers:

- *“How did your past experiences (e.g., making paper airplanes) help or hinder you today?”*
- *“Did you feel more confident because of prior folding experience, or frustrated if it didn’t translate?”*
- *“How do past clinical experiences shape how you approach new procedures? (E.g., a difficult catheterization making you cautious next time).”*

Learning from direct, hands-on experience.

Phase 1 Debrief

🧠 Abstract Conceptualizers:

- *“How has reading about the principles of origami helped with your understanding of the task?”*
- *Did the origami principles you read/watch feel intuitive or disconnected from the hands-on task?”*
- *“How could you use this theory to teach someone else to fold more effectively?”*
- *“In medicine, when is theory essential before practice? (E.g., theory ensures safety—like understanding sterile technique before handling a central line).*

Learning through theory and frameworks.

Small Group Discussion

Group	Discuss	Reflect
Break participants into small groups of 3	Discuss the responses based on the questions	Challenges Strategies How learning style influences approach

Group Sharing

One representative from each group will summarize their key insights

Perspectives from different learning styles

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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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
    - 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

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Description

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

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Examination

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

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 **L**earning

- 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

Debriefing Strategy: Advocacy-Inquiry

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
  - Provide role-specific context
  - Facilitators to manage group dynamic

Debriefing after an IPE simulation

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Co-debriefing process

- 2 or more persons facilitate the session for added context

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
  - Aims to guide and correct
  - **The perceived skills of the debriefer** has the highest independent correlation to **the perceived overall quality** of the simulation experience

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

Instructor/Facilitator-Led Debriefing

- "Gold standard" for debriefing
- 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)
  - No significant effect of the debriefing type was found on the performance
  - Both within-team and instructor-led teams improved in their Team Emergency Assessment Measures

- 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?	
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]."

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The Analysis Phase

Performance Domains

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

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)

Phase 2

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

Phase 2 Debrief – Instructor-Centered

- Scene
- Reaction
- Description
- Analysis
- Application

Phase 3

Station 1	Storytellers (AE)– make an origami crane using the given instructions Trailblazers (RO) – watch and comment on Storytellers' performance
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Phase 3 Debrief – Learner-Centered

- Small group discussion: Takeaways
  - What are your takeaways from this exercise – with relevance to Kolb's application to procedural skills/simulation-based teaching?

Phase 4

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

Break

Test Your Learning

1. Fold a second paper crane in 5 minutes

2. Respond to PollEv evaluation questions

Conclusion

- Experience the different stages of Kolb's Experiential Learning cycle through a fun origami activity
- Identify on the different educational models that can be used in teaching procedural skills and debriefing
- Apply the PEARLS framework in a debrief

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Workshop Evaluation & Debrief

INTAPT 2024-25 Workshop - Day 8AM - Simulation / Procedural Skills

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