

*The “Master Adaptive Learner” in
Clinical Practice:
Is there a role in CME/CPD ?*

Faculty

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Disclosure

- I do not have any financial relationships with any commercial entity that makes or distributes products and/or services used by or on patients that are relevant to the content of my presentation.

Learning objectives

After participating in this session, you should be able to describe and discuss:

1. The concept of *adaptability* as demonstrated by the difference between routine and adaptive expertise;
2. The importance of conceptual understanding in *preparing* medical students, residents, and practicing physicians *for future learning* as master adaptive learners;
3. The importance of balancing *efficiency and innovation* when evaluating patient presentations;

Learning objectives

After participating in this session, you should be able to describe and discuss:

4. The role of **metacognition** in adaptive expertise;
5. The **process** that a master adaptive learner follows when he or she learns;
6. **How CME/CPD can help** develop and/or support a master adaptive learner.

What is the current situation?

- Conventional view: as clinicians develop expertise, they are increasingly able to solve patient problems by applying what they learned in “educational” settings to clinical settings.
- Clinicians “transfer” what they have learned into the new setting when they recognize “patterns” from their training in their patients.
- Challenge: What if what they can’t recognize the patterns that they have learned in their patients?
 - Novel patient presentation.
 - Therapeutic regimen is not working.

What does it mean to be “adaptive”

- To address this challenge, clinicians must be adaptive.
- They must learn to navigate in situations where they are at the edge of their existing knowledge.
- Clinicians who function as “*routine*” experts *rely on what they have learned* to solve problems; they become very efficient and proficient at what they do, but may not be able to address this challenge.
- Clinicians who function as “*adaptive*” experts address this challenge by *learning as they solve problems*. They do this by
 - Resist “premature closure” - relying on what they know now.
 - Recognize that a routine solution may not work.
 - Challenge themselves to search for new insights and perspectives.

Routine + Adaptive

- Some clinicians become routine experts who have mastered a strong set of knowledge and skills to address routine clinical presentations.
- Other clinicians have mastered *additional* knowledge and skills that enable them to address novel presentations and/or unexpected outcomes by
 - Reflecting on the fundamental conceptual knowledge that supports what they know clinically
 - Consulting with their fellow health care workers
 - Inventing possible approaches
 - Trying out an approach that has potential
 - Forming a new pattern when the outcome is positive

Who is a Master Adaptive Learner?

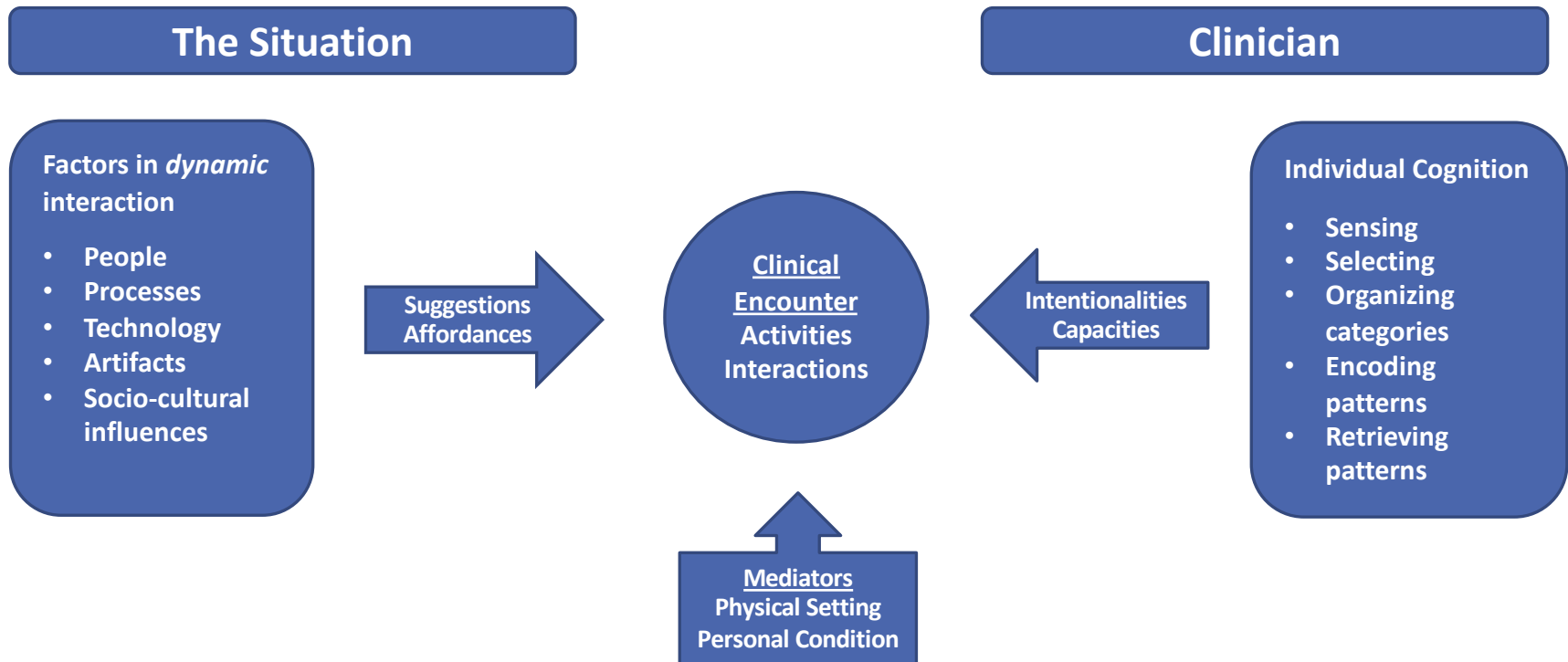
- A Master Adaptive Learner has developed the expertise to
 - recognize that a current approach to managing a group of patients is not working.
 - learn-in-practice a new approach to address a novel presentation.
- A Master Adaptive Learner has been prepared for future learning by having a strong foundation of basic science knowledge that is linked to his or her clinical knowledge.
- In practice, a Master Adaptive Learner follows a four-phase process to “invent” a new approach if a current approach does not appear to lead to desired patient outcomes.

Dr. Ima Lerner

A Master Adaptive Learner

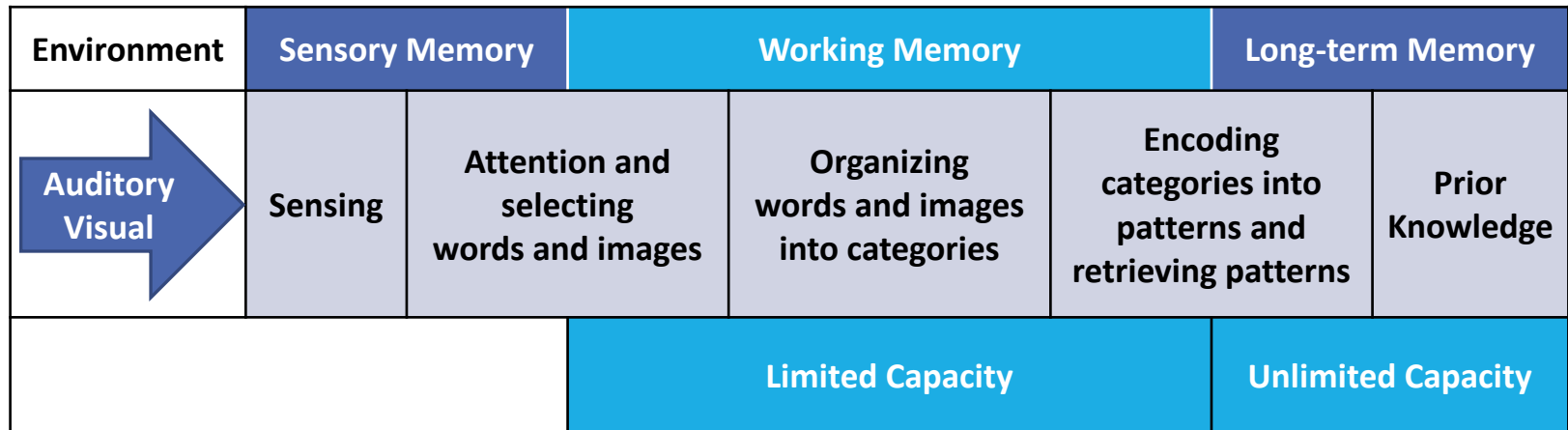
- Community-based primary care physician.
- She has been in practice for over 10 years in a medium-sized multi-specialty group.
- Researchers have suggested that many clinicians reach “expert” status after 10 years in practice.
- In the normal course of a day in her busy practice, she sees a wide variety of patients.
- She has developed an interest in helping patients with diabetes and a larger proportion of her patients have been diagnosed with type-2 diabetes (T2D).
- Most of her appointments for diabetes patients are return visits and there are occasional visits from new patients.

Clinical Reasoning

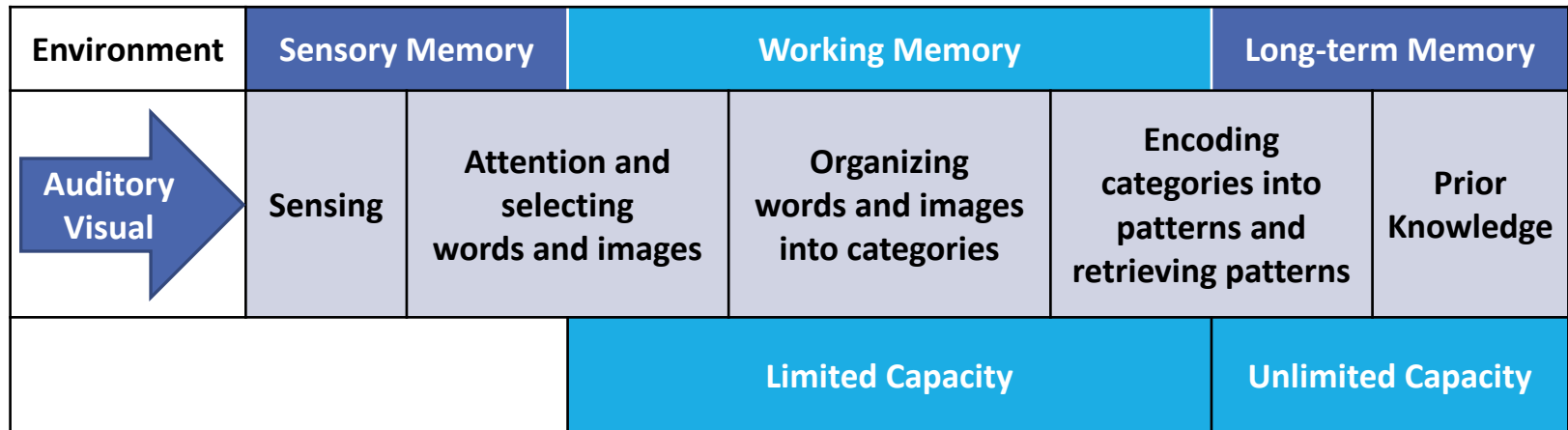


Adapted from Billett S. Conceptualizing learning experiences: contributions and mediations of the social, personal, and brute. *Mind Cult Act*.009;16(1):32-47.

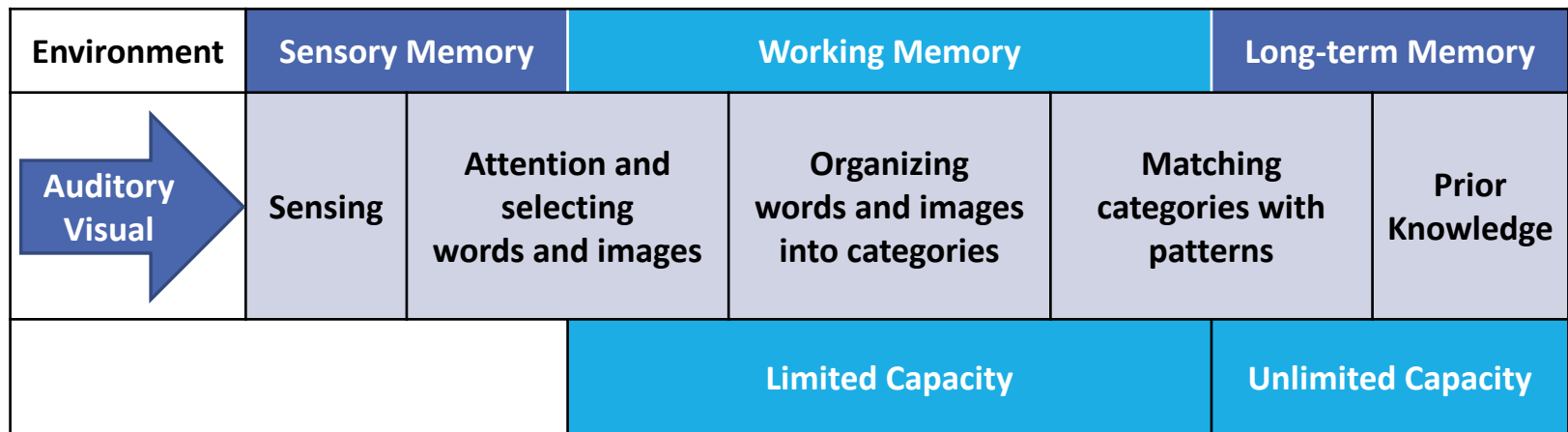
What is going on during clinical reasoning?




What is going on during clinical reasoning?




What is going on during clinical reasoning?




Novel presentation

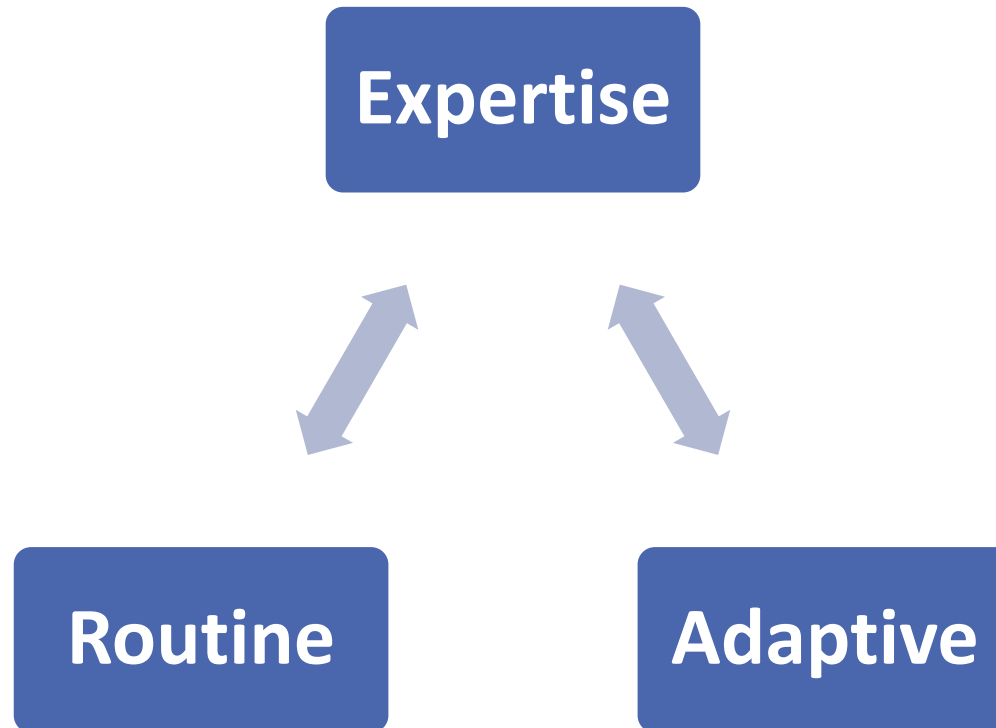

Absence of expected outcomes


Does not match

Adaptability

- An important attribute of the expertise in clinical reasoning that is needed by a 21st century physician is **adaptability**.
- Adaptability is the capability to be flexible and willing to change an approach to adjust to unfamiliar or unexpected conditions.
- Adaptability enables a physician to recognize that a usual approach to diagnosing and treating a patient may not work in every situation, and, as a result, modify or change the approach.
- A more appropriate approach may be contingent on a variety of biological/genomic and socio-economic, cultural, and health system forces that impact a physician and her patient.

Adaptive expertise



Developing adaptive expertise

Developmental Levels of Expertise	
Routine Expert	Adaptive Expert
Novice	Novice
Advanced Beginner	Advanced Beginner
Competent	Competent
Proficient	Proficient
Routine Expert	Routine Expert
	Adaptive Expert

Characteristics of Levels
Novice: Beginner with no experience must depend on rules to guide actions.
Advanced beginner: Has had enough experience to recognize that situations have recurrent meaningful patterns.
Competent: Can rely on long-range goals and plans to determine which aspects of a situation are important and which can be ignored.
Proficient: perceives situations as wholes with integrated aspects and can consider fewer options.
Routine Expert: Has intuitive grasp of situation and can zero in on routine solution.
Adaptive Expert: Recognizes routine solution will not work and pursues innovative solution.

Preparation for future learning

- A physician who has developed adaptive expertise manages routine patients with known approaches and challenging patients with innovative approaches.
- When applying what was learned does not seem to work, an adaptive expert can reinterpret what he knows based on available information and circumstances to create an innovative approach based on a patient's needs.
- This type of performance is made possible by being “prepared for future learning”.

Preparation for future learning

- Medical students, residents, fellows, and practicing physicians can be prepared for future learning by providing them with opportunities to *learn clinical knowledge and biomedical concepts concurrently*.
- In this way, basic science concepts become *encapsulated* with clinical facts in the mental representation of a disease.
- Knowledge encapsulation is one of the cognitive processes through which new knowledge is stored in *neural networks* in long-term memory and made available for retrieval.
- Conceptual details of the biomedical sciences and their interrelations become associated in networks with representations of clinical experiences.

Preparation for future learning

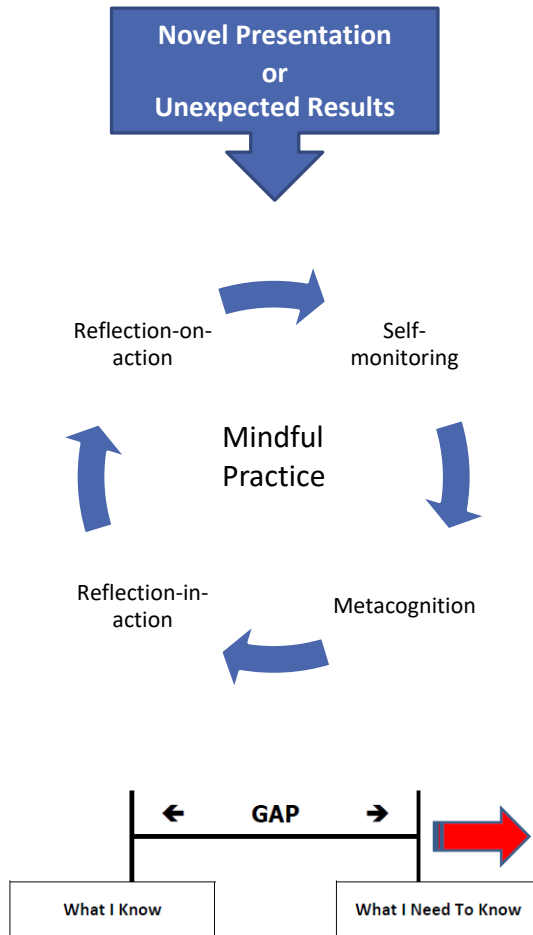
- When a clinical representation is activated by a patient's signs and symptoms, an experienced clinician can diagnose and manage the patient by retrieving the representations stored in long term memory without having to refer to the underlying biomedical concepts and principles.
- The integration of basic science principles with representations of clinical experiences is strengthened through increasingly challenging training and deliberate practice with both routine and challenging cases.
- With time clinicians will be able to seamlessly recognize a group of clinical facts linked by underlying basic science concepts without needing to consciously consider the pathophysiology.
- In this way, encapsulation enables a clinician to use pattern recognition to diagnose and manage routine patients with increasing automaticity.

Preparation for future learning

- In some cases, however, a patient's clinical presentation may activate a mental representation of a specific disease quickly, but the diagnosis and/or management plan pursued by a physician was not effective.
- In other cases, a patient's clinical presentation might not activate a workable disease representation.
- In these and similar cases, a clinician would experience a “surprise” or “cognitive dissonance”, prompting reflection in action, and a search for an appropriate diagnosis or management plan.
- Let's see how that might work ...

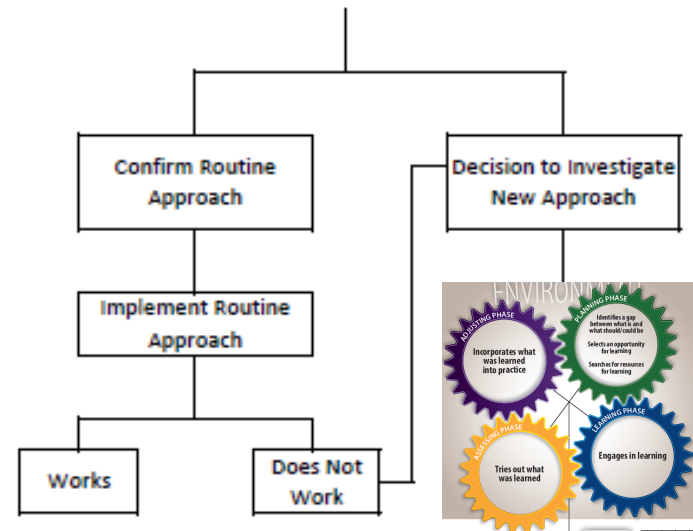


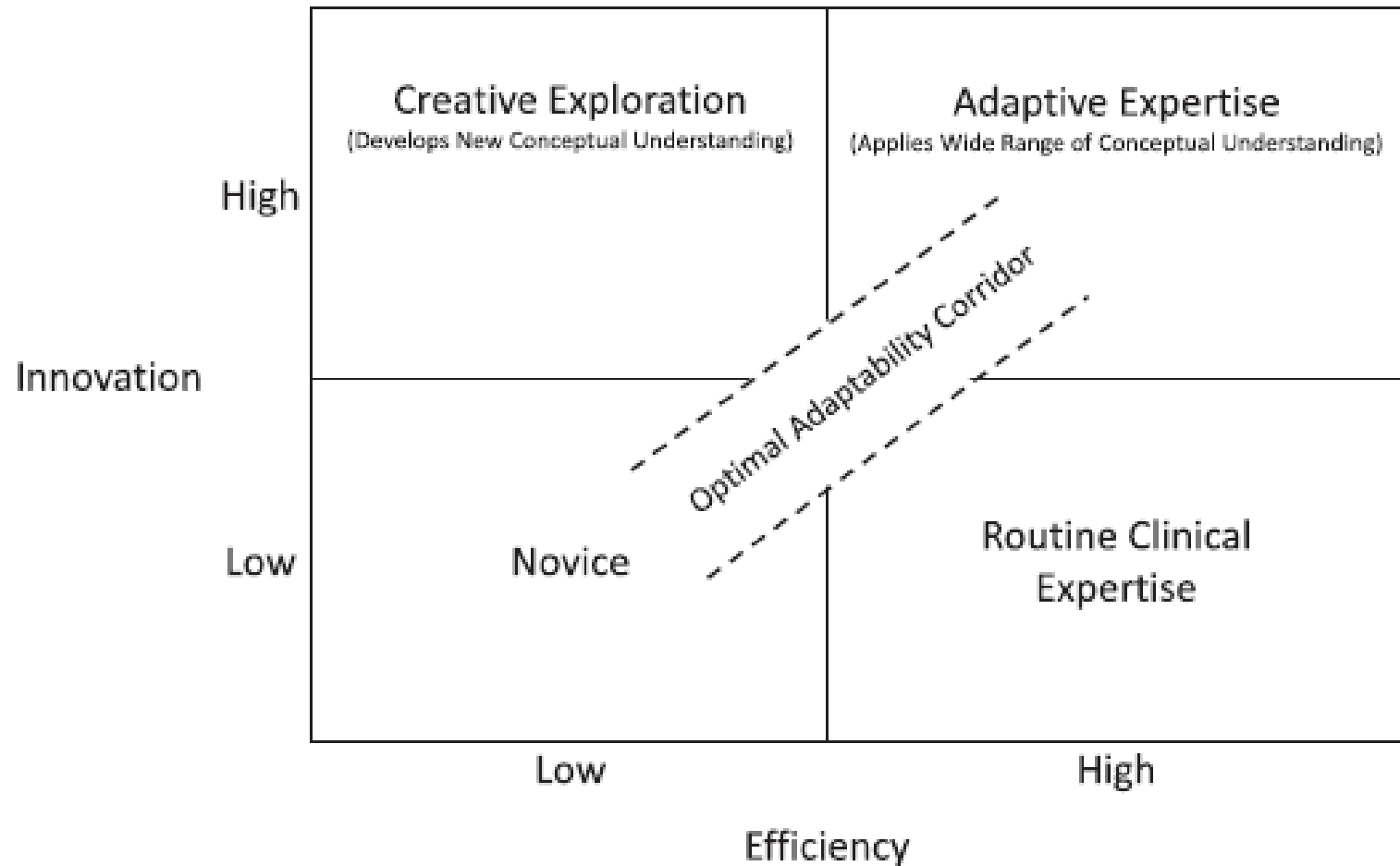
Beginning the Journey of a Master Adaptive Learner



Critical Thinking

1. Identify assumptions
2. Analyze assumptions
3. Pursue alternative perspectives
4. Take informed action





Cutrer WB, Miller BM, Pusic MV, Mejicano G, Mangrulkar RS, Gruppen LD, Hawkins RE, Skochelak SE, Moore DE Jr.,
Fostering the development of Master Adaptive Learners: A conceptual model to guide skill acquisition in medical education.
Academic Medicine; 2017: 92.1:70-75.

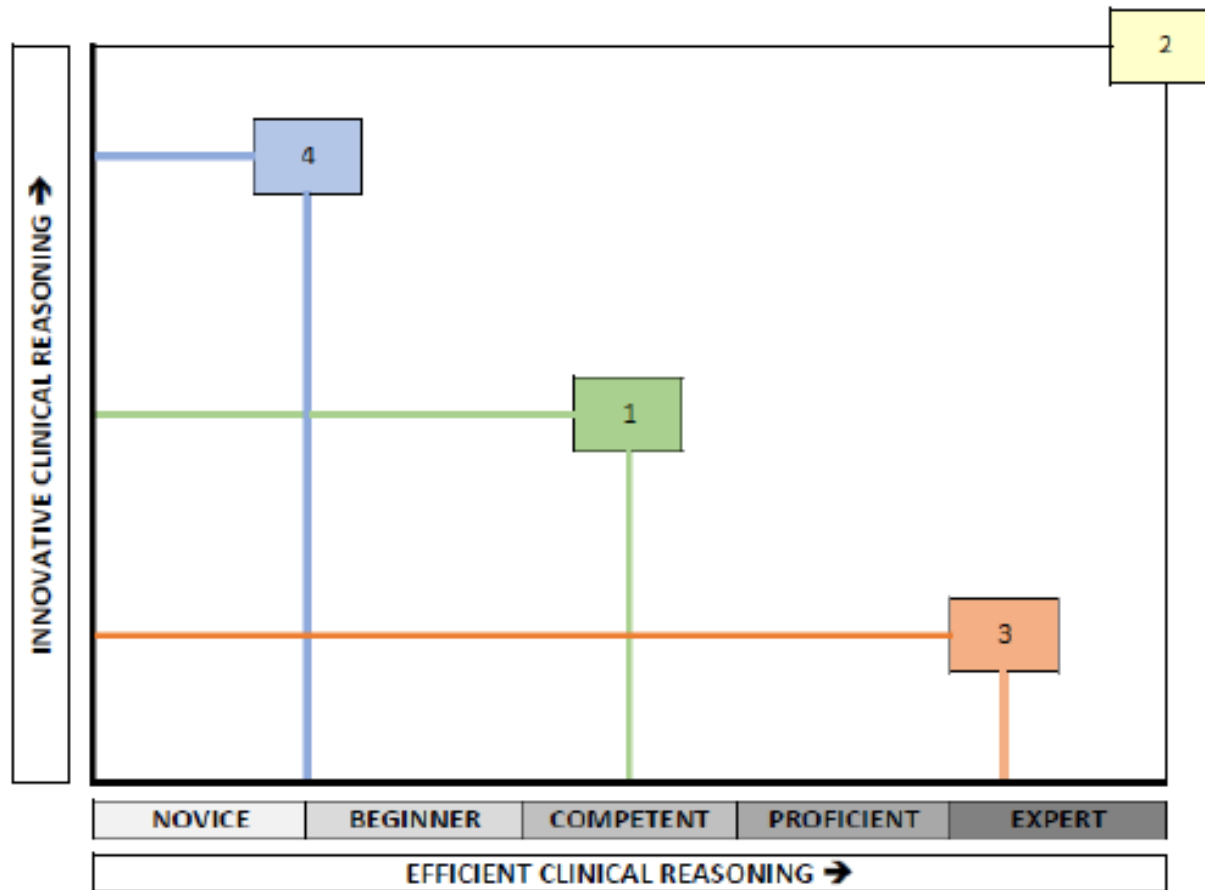


Figure 2, Coordinate graph adapted from

28. Pusic MV, Santen SA, Dekhtyar M, et al. Learning to balance efficiency and innovation for optimal adaptive expertise. *Medical teacher*. 2018.
29. Rebello NS. Can we assess efficiency and innovation in transfer? Paper presented at: Physics Education Research Conference 2009; Ann Arbor MI.

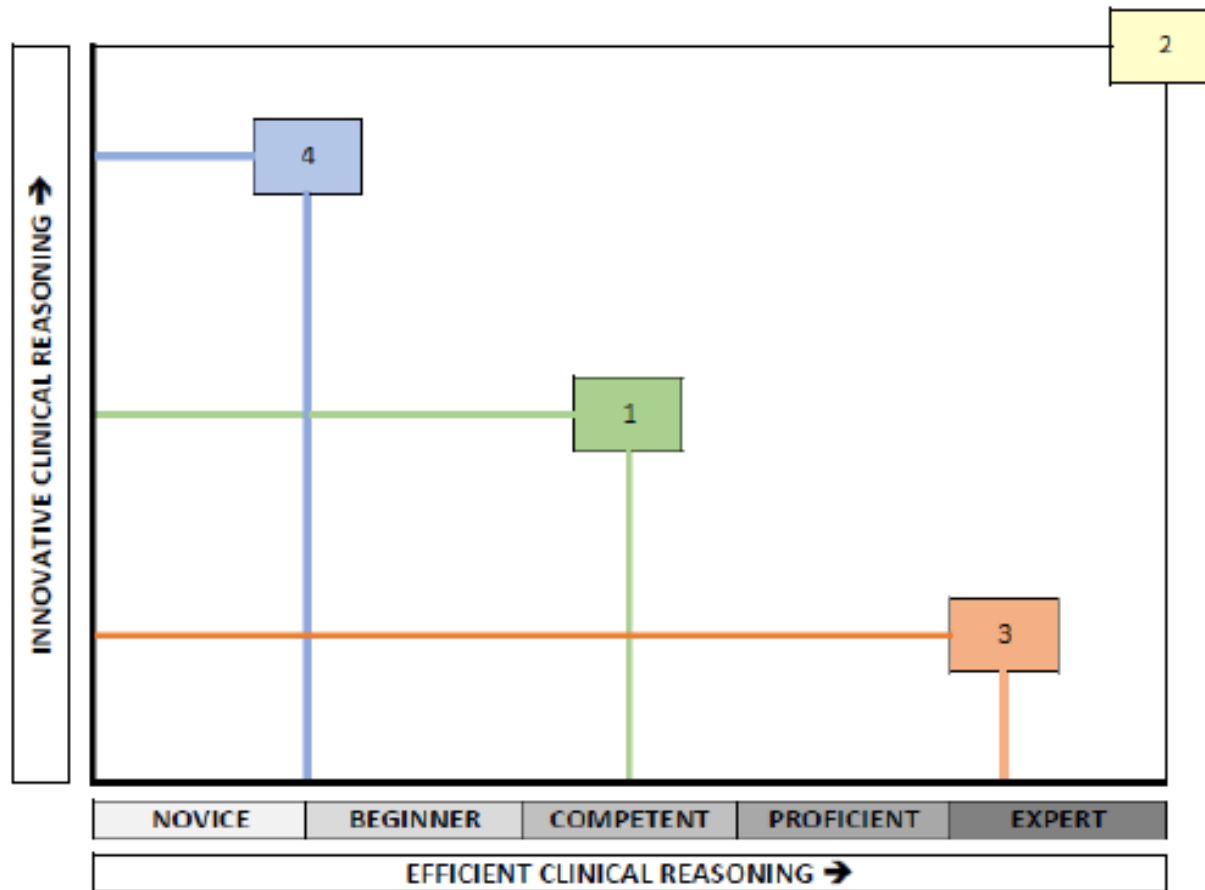


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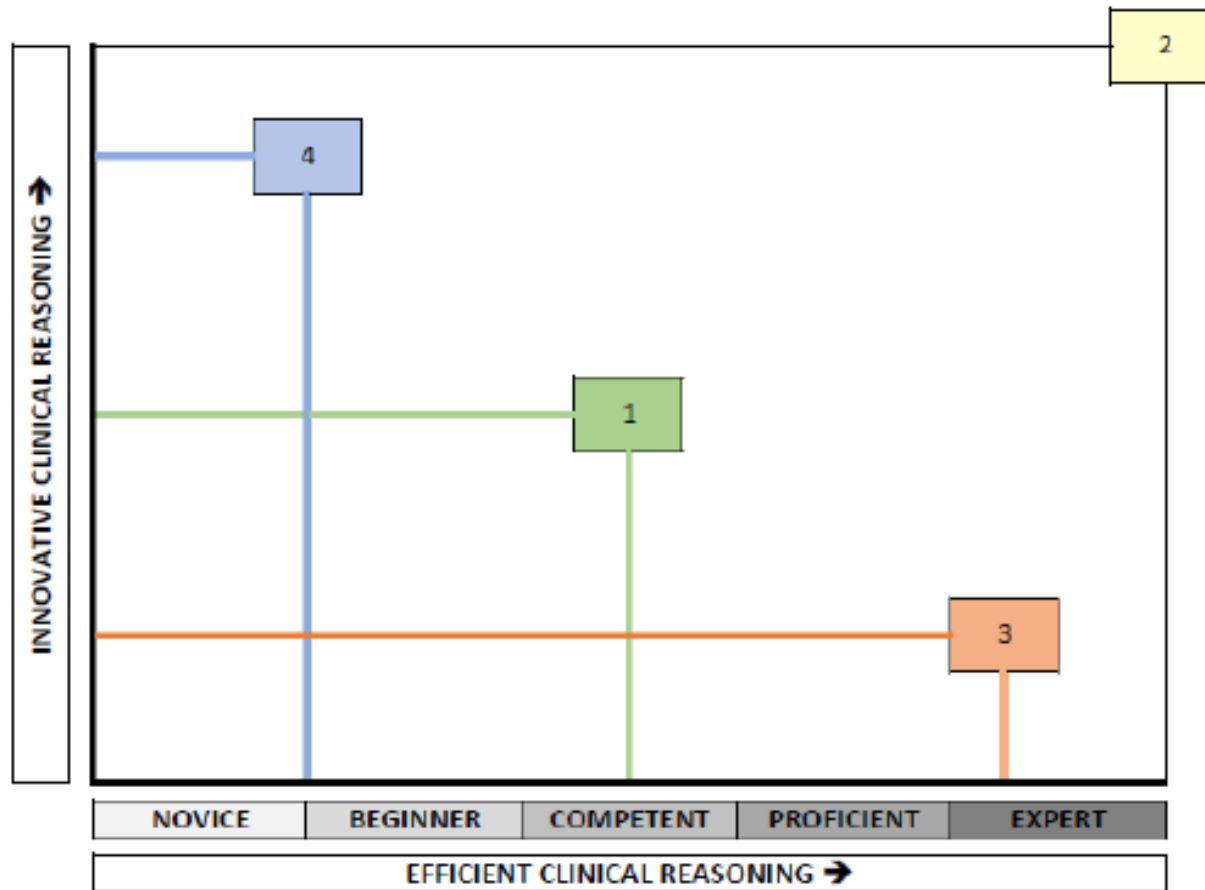


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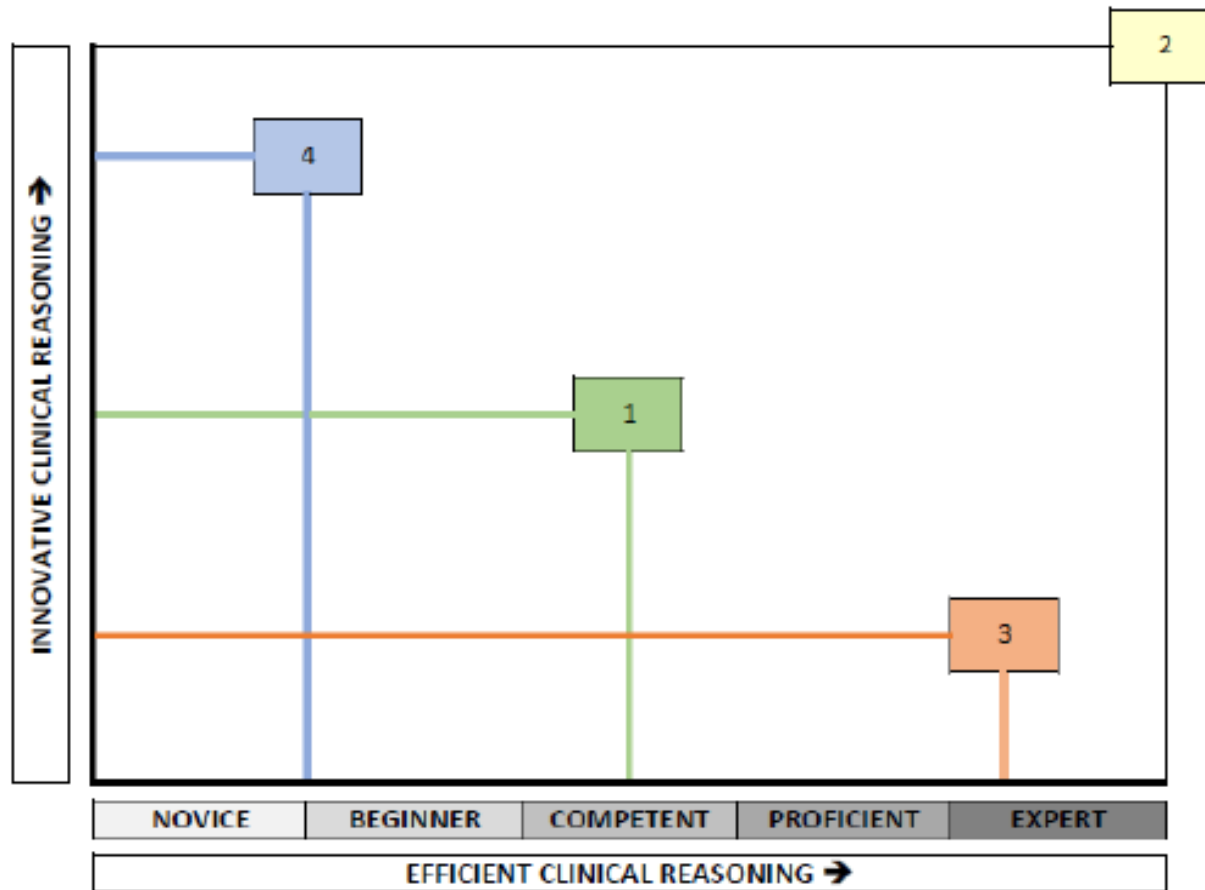


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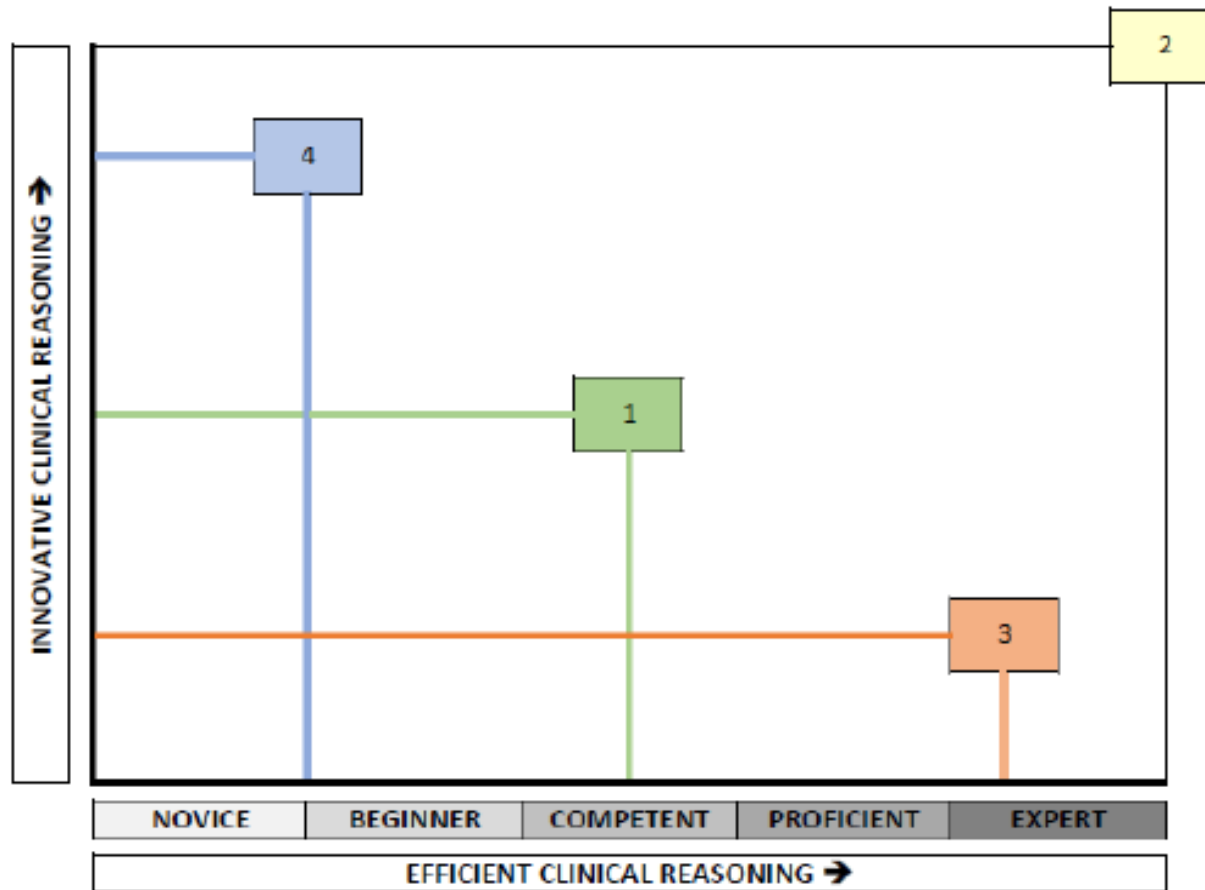


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A metacognitive disposition

- Central to the approach of a Master Adaptive Learner to clinical reasoning and adaptability is a willingness and an intrinsic need to continuously review and analyze what she is doing and thinking and make changes if the results of doing and thinking are not what was expected.
- This is called meta-cognition, a capability to “rise above” current thinking and activity to gain a better perspective.
- Metacognition has been described as higher order thinking that enables understanding, analysis, and control of an individual’s cognitive processes.
- Metacognition is important in the clinical encounter because it helps a clinician recognize what a patient needs and how to address his or her needs.
- As healthcare and the clinical encounter become increasingly complex, a clinician may become increasingly uncertain about what to do. Uncertainty varies from situations that are simple to those that are chaotic.

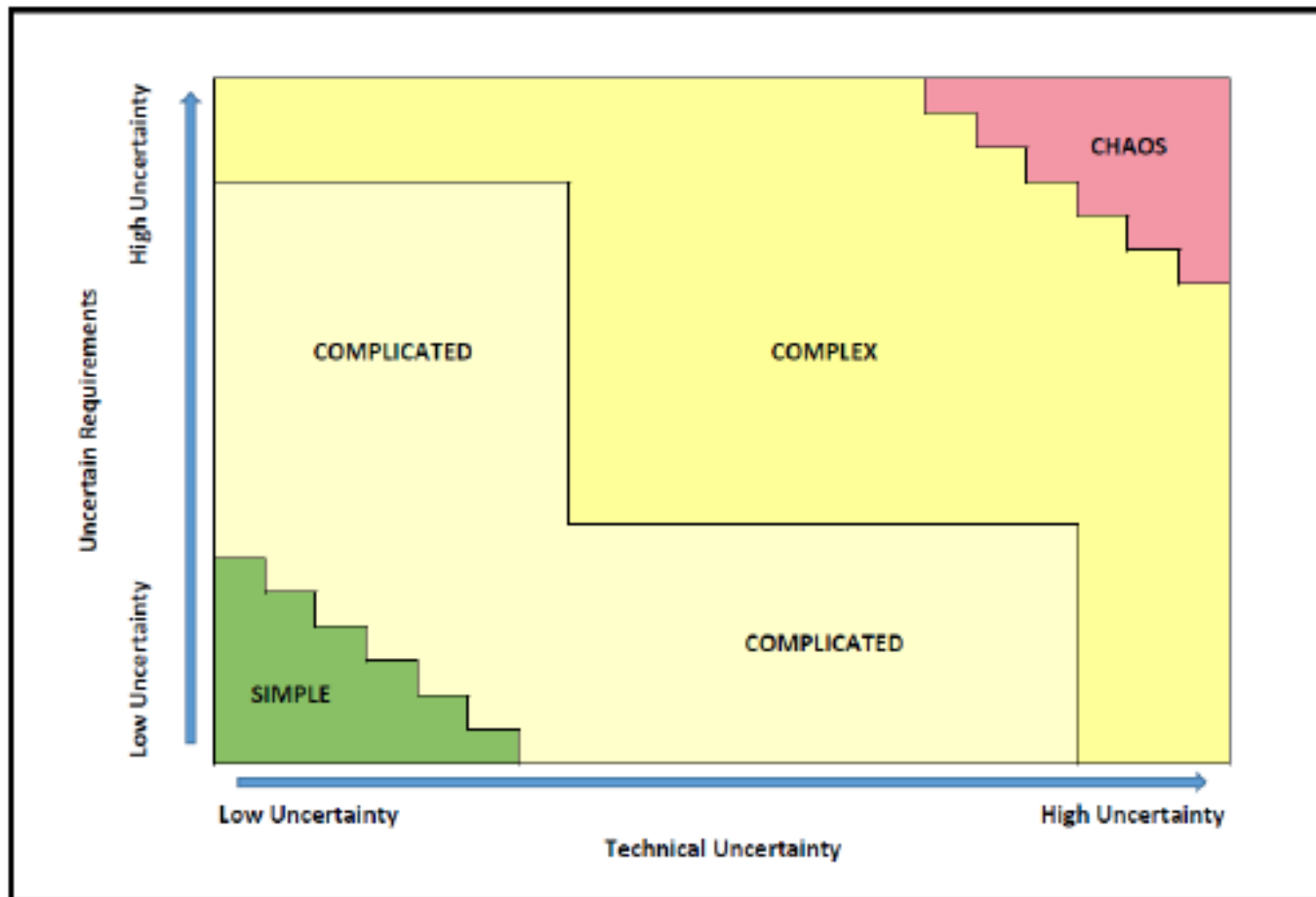


Figure 3, Stacey Complexity Model

Stacey RD, Mowles C. Strategic management and organizational dynamics: The challenge of complexity
7th edition. Harlow UK: Pearson Education, 2016

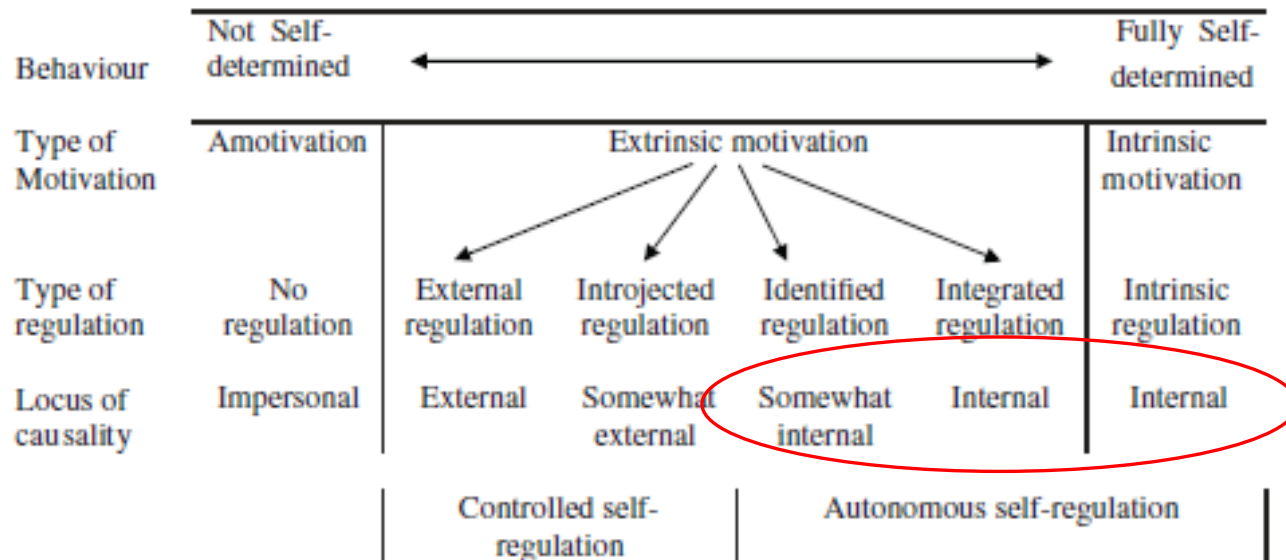
A metacognitive disposition

- For a clinician in a clinical encounter, a metacognitive disposition generates awareness about the match between what a physician knows and can do and what is required for her to know and do in a particular situation
- Metacognition provides a clinician with three complementary approaches to thinking that address uncertainty:
 - metacognitive monitoring;
 - metacognitive control;
 - predisposition to learn.

Learning and Motivation

- Learning may be a combination of self-regulated learning (SRL), self-directed (SDL) and motivation.
 - SRL is defined as learning that is metacognitively guided, at least partly intrinsically motivated, and follows a strategic plan.
 - SDL is usually defined as a process in which individuals take the initiative to diagnose learning needs, participates in learning, and evaluates learning outcomes.
 - SRL and SDL are often used interchangeably.
- Motivation is a hypothetical construct that describes the internal process whereby inner and outer forces produce the start, direction, intensity, and persistence of behavior, for example, the engagement and persistence in learning projects.
 - Self-determination theory (SDT) describes a continuum of motivation that includes external motivation and internal motivation.

The continuum of motivation in Self-Determination Theory



Adapted from Ryan RM, Deci EL 2000 in
ten Cate OTJ, Kusurkar RA, Williams GE 2011

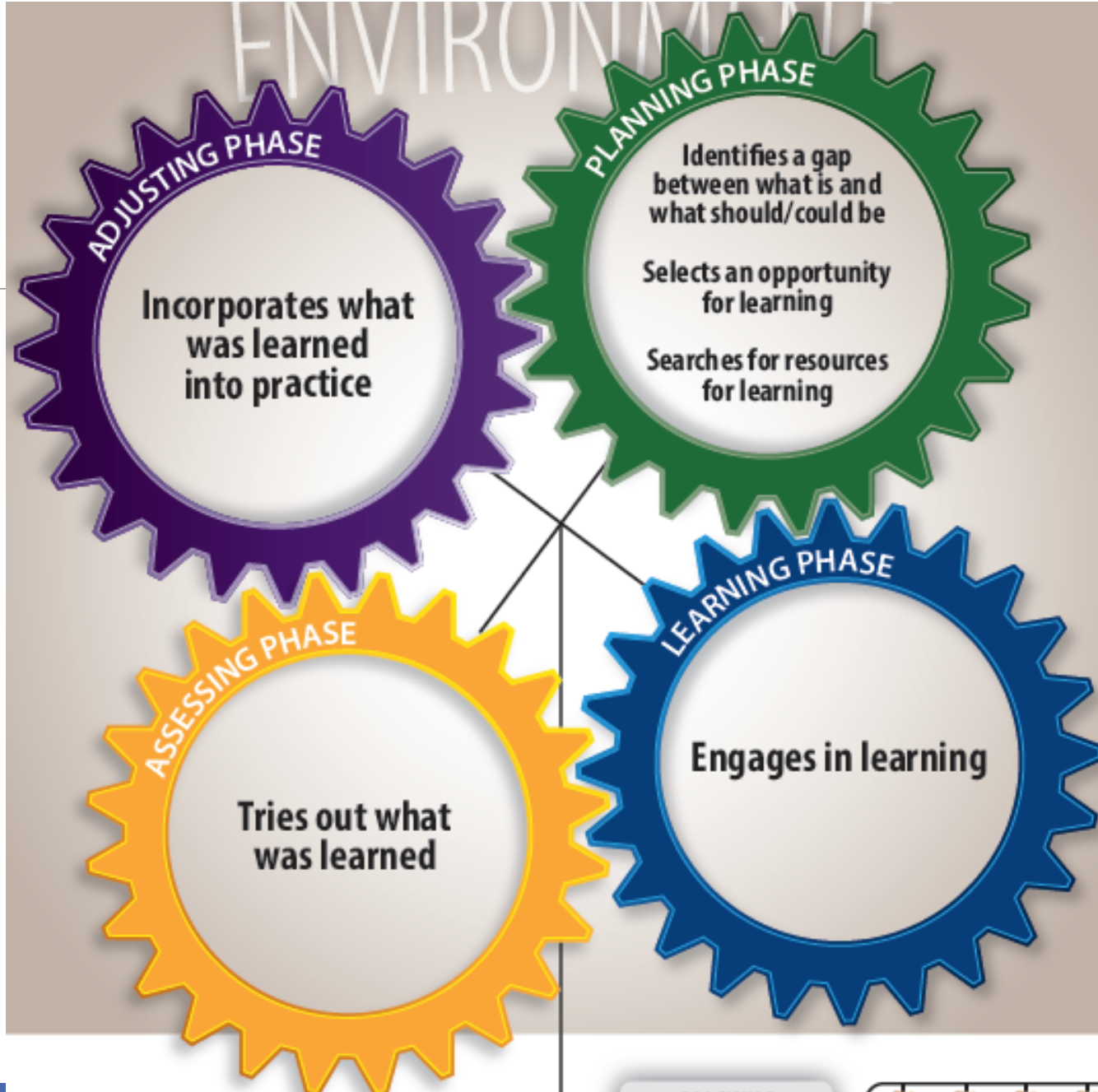
Motivation and Learning

- Motivation is not enough to achieve the desired results of demanding learning projects; a volitional dimension must come into play to sustain an agent's effort toward a personal goal.
- Self-regulation, as a dynamic combination of strategies and will power (volition) is linked to success in academic and work performance in several research studies.
- Self-direction represents the individual agency of a master adaptive learner to pursue learning in situations characterized by challenging uncertainty.

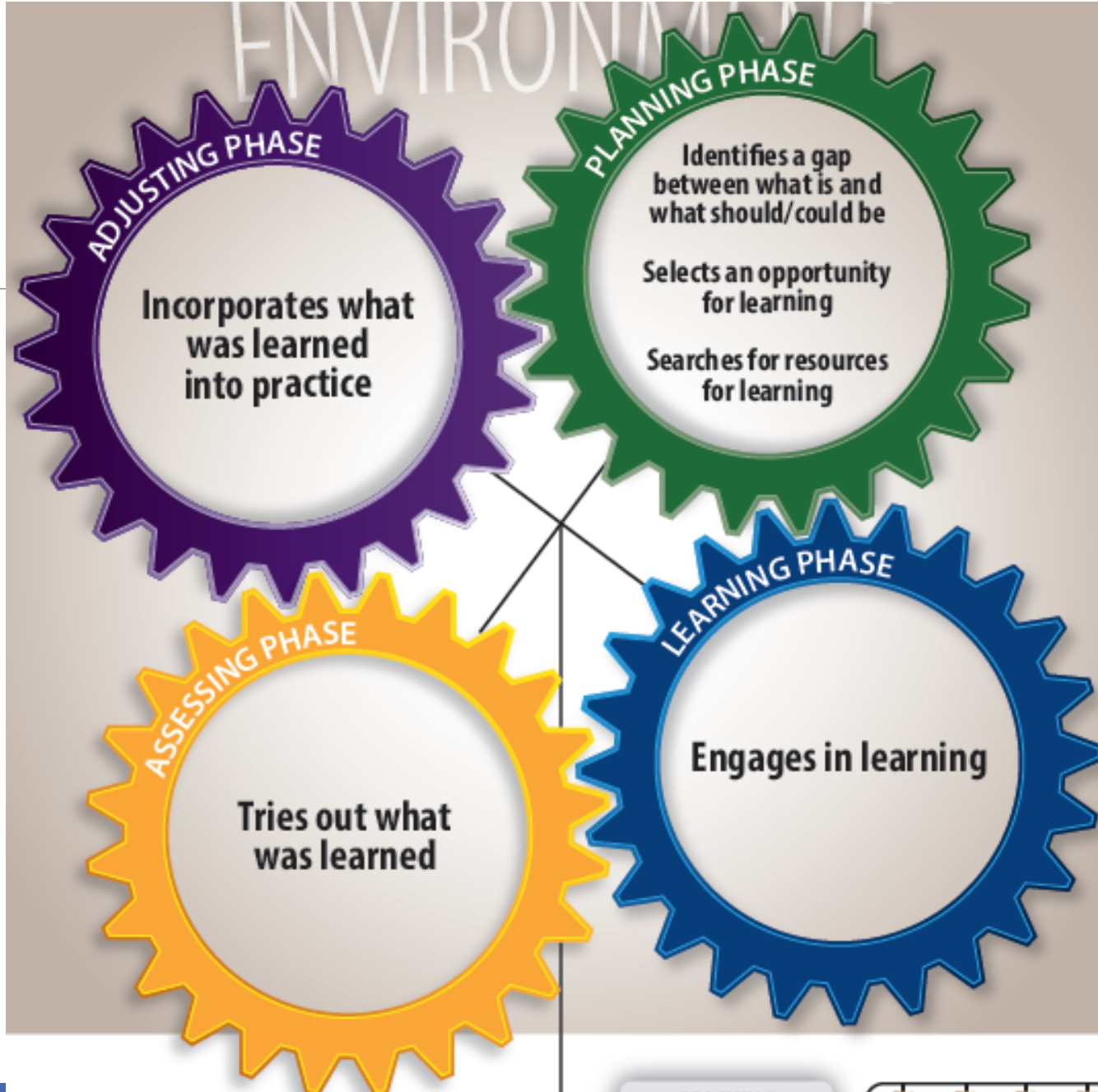
Motivation and Learning

- The learning that a Master Adaptive Learner would pursue can be conceptualized as a combination of self-determination, self-regulation, and self-direction.
- Internal motivation, activated by cognitive dissonance, can be considered as the starting point of individual learning and change.
- Clinicians will learn only if the content (knowledge and skills) to be learned addresses what they consider to be their own problems in their own situations.
- Let's examine one of Dr. Lerner's learning experiences as a master adaptive learner.

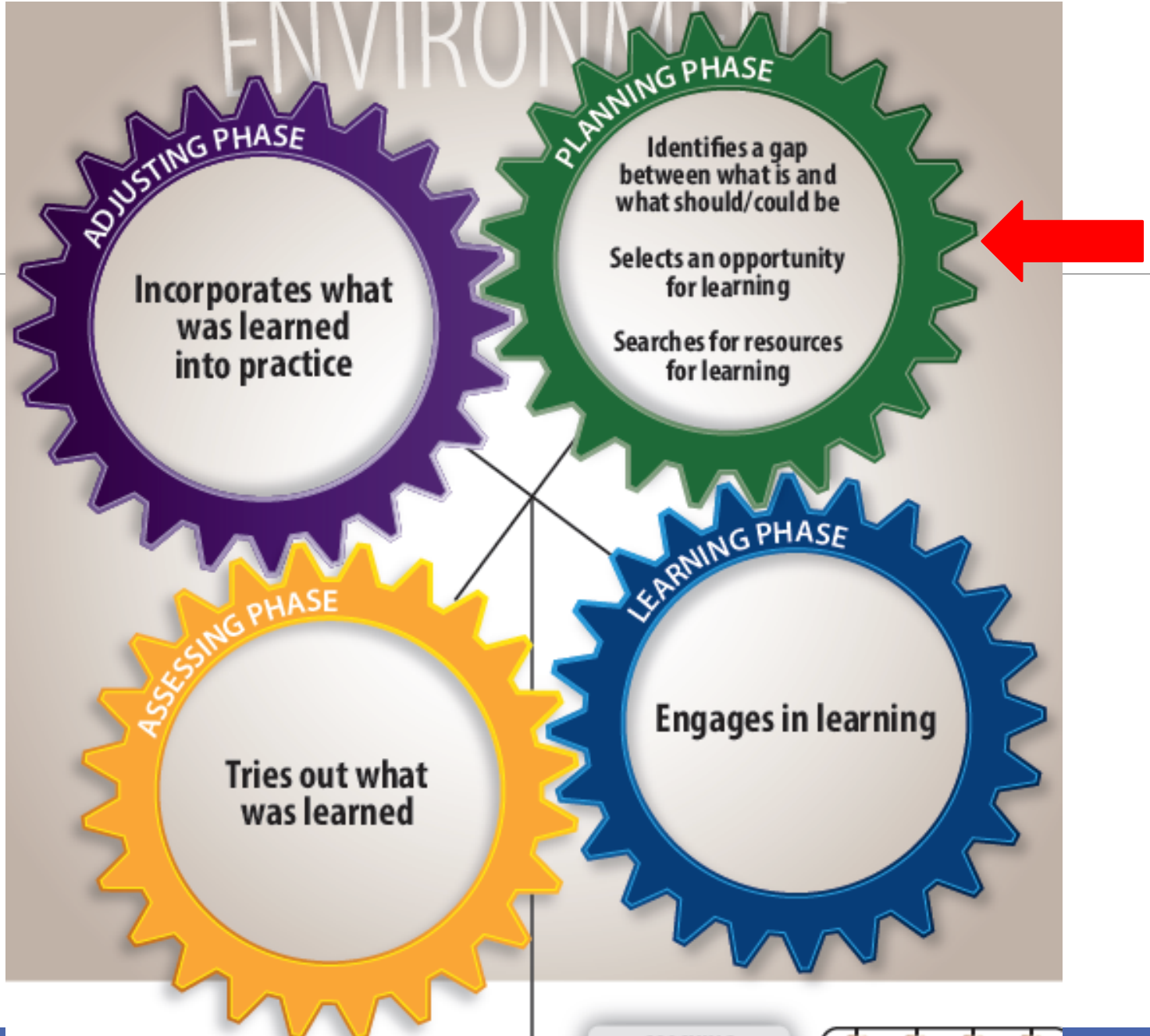
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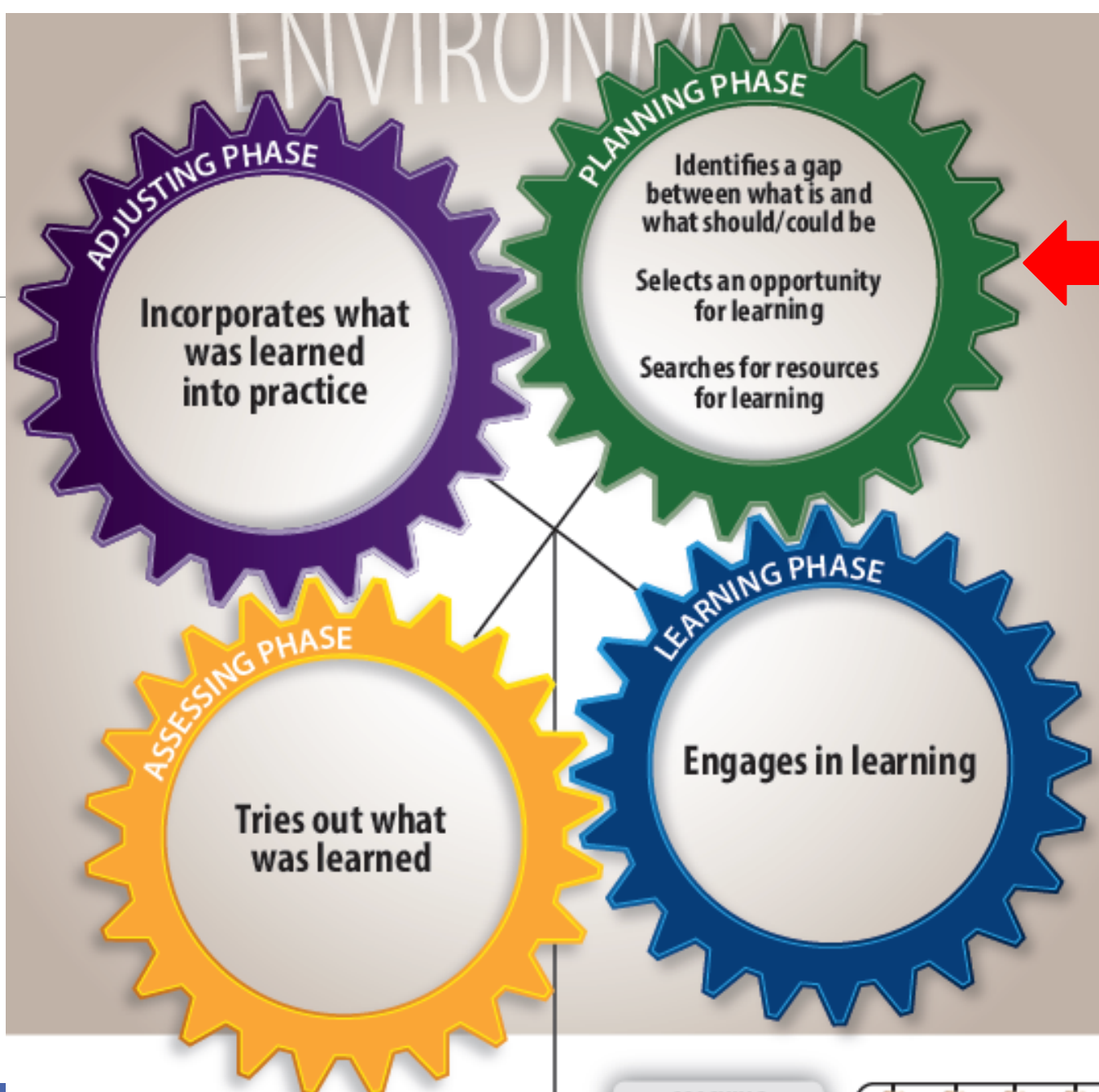


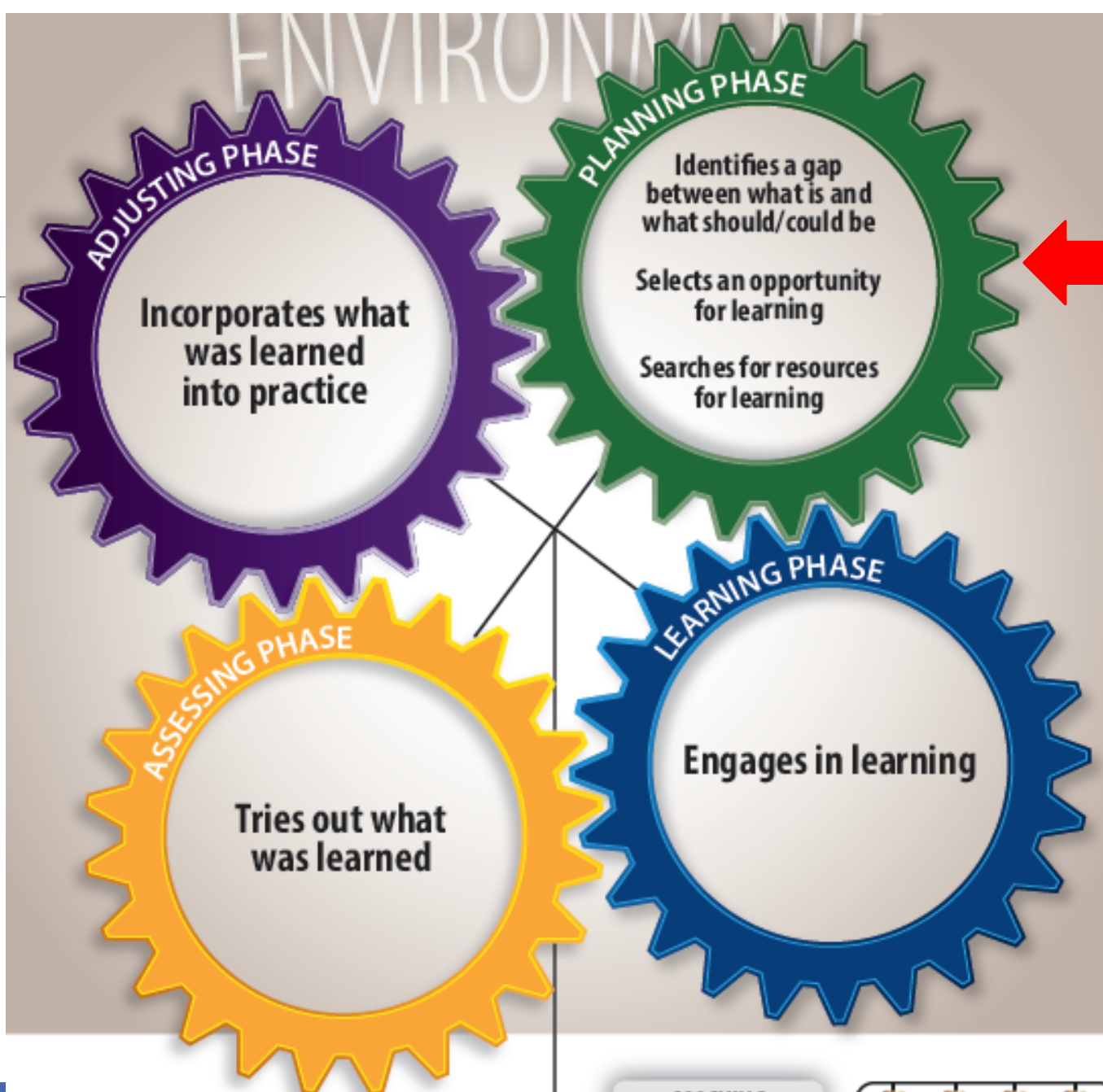
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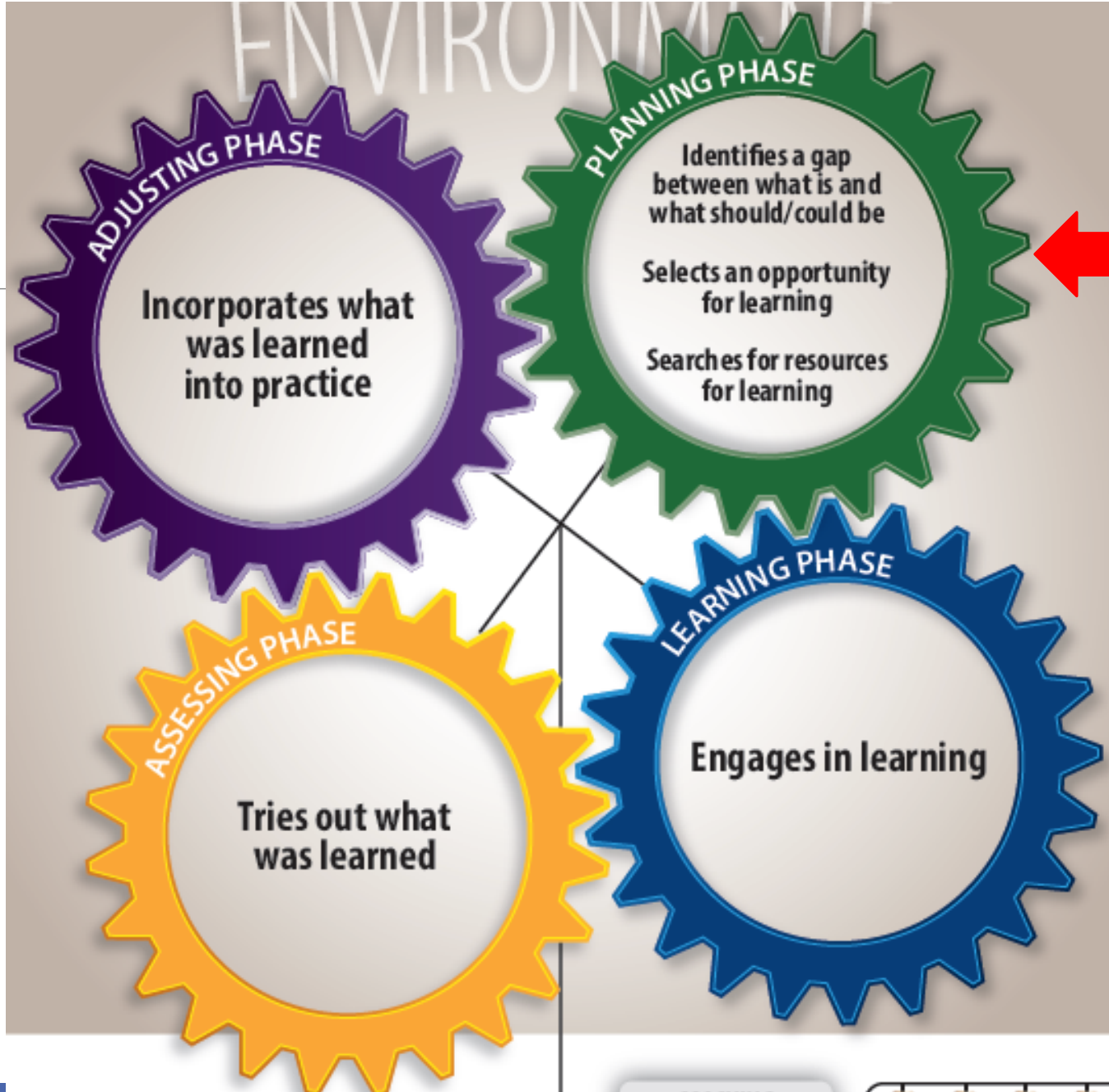
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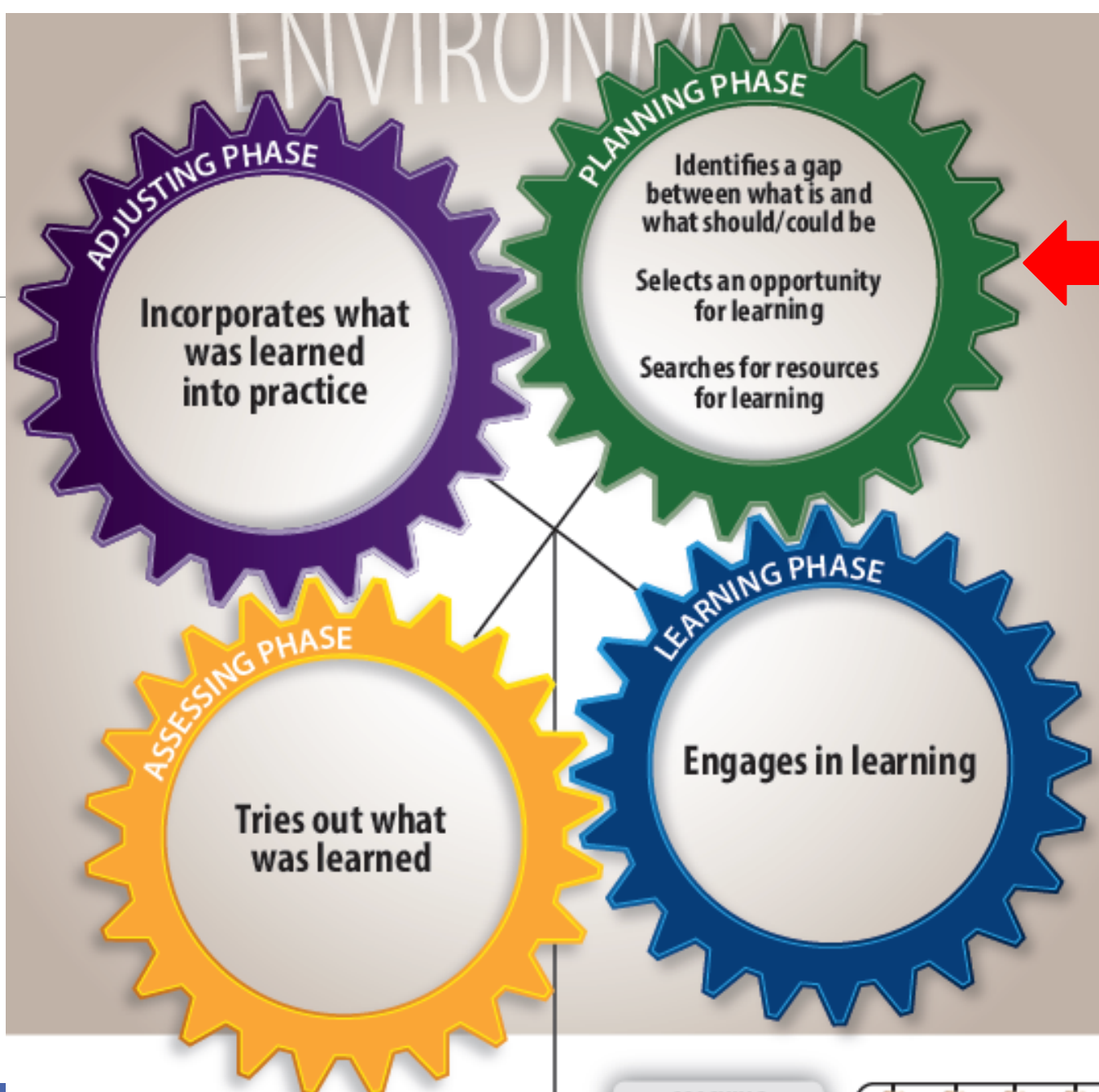


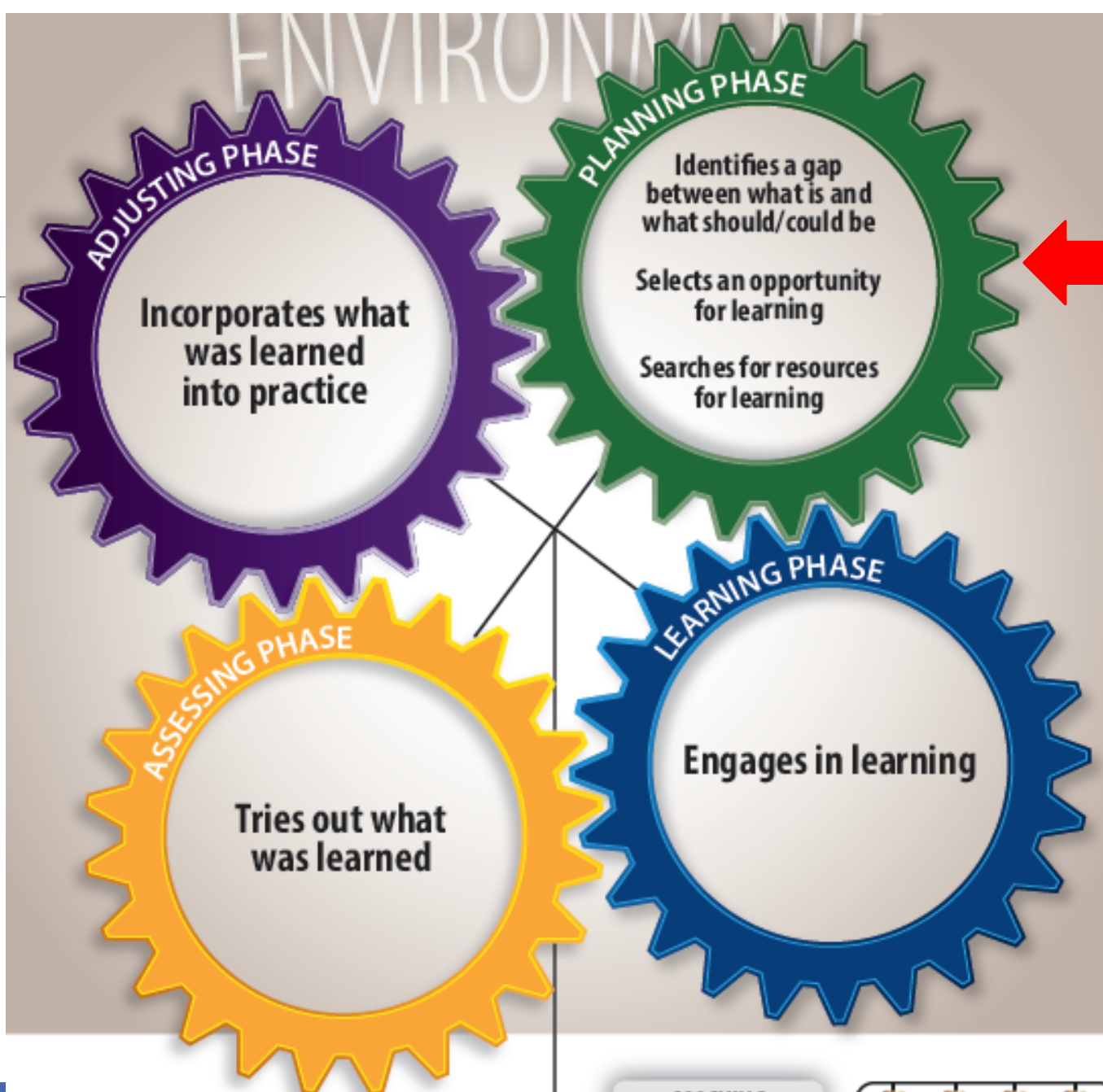


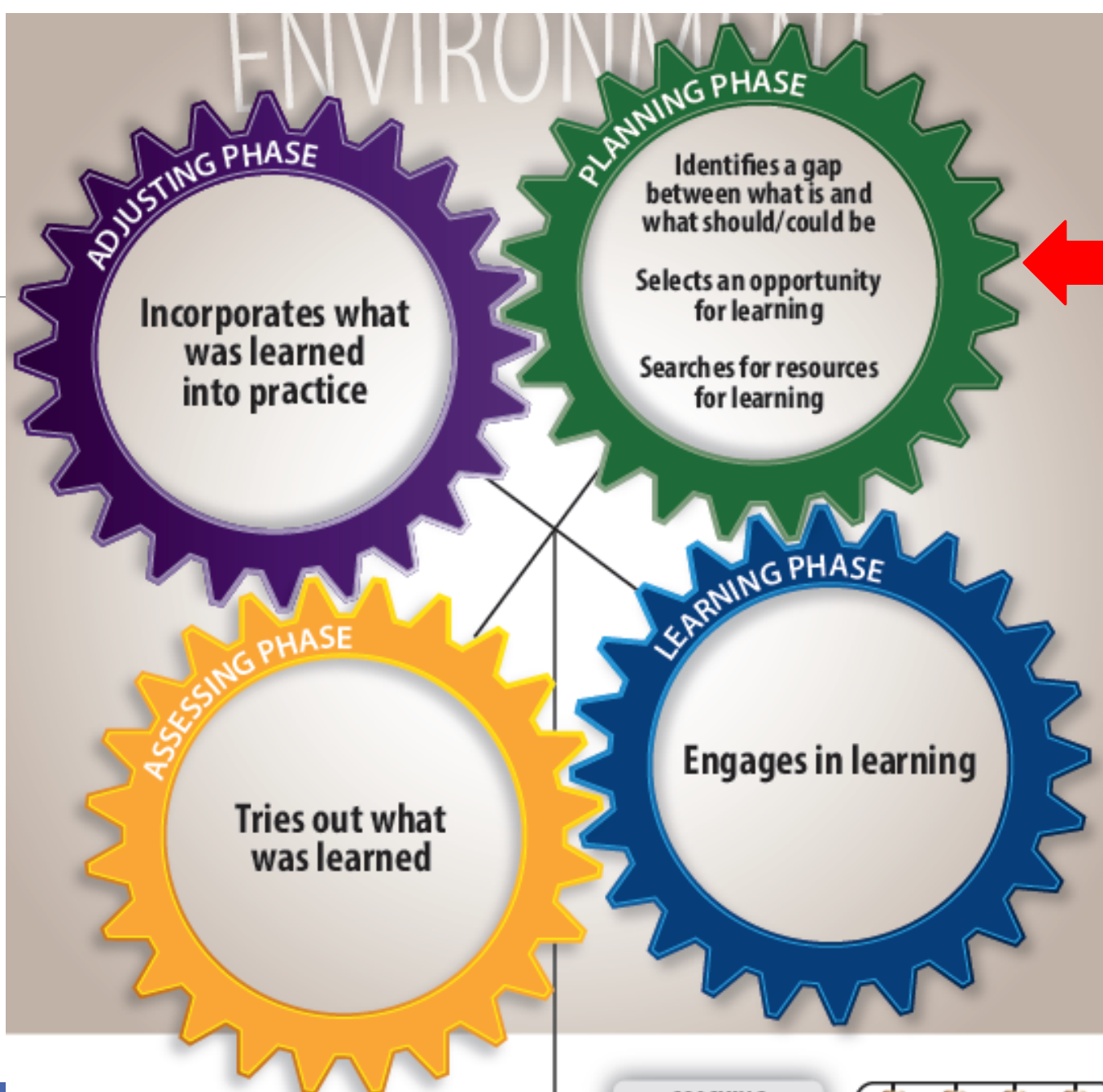


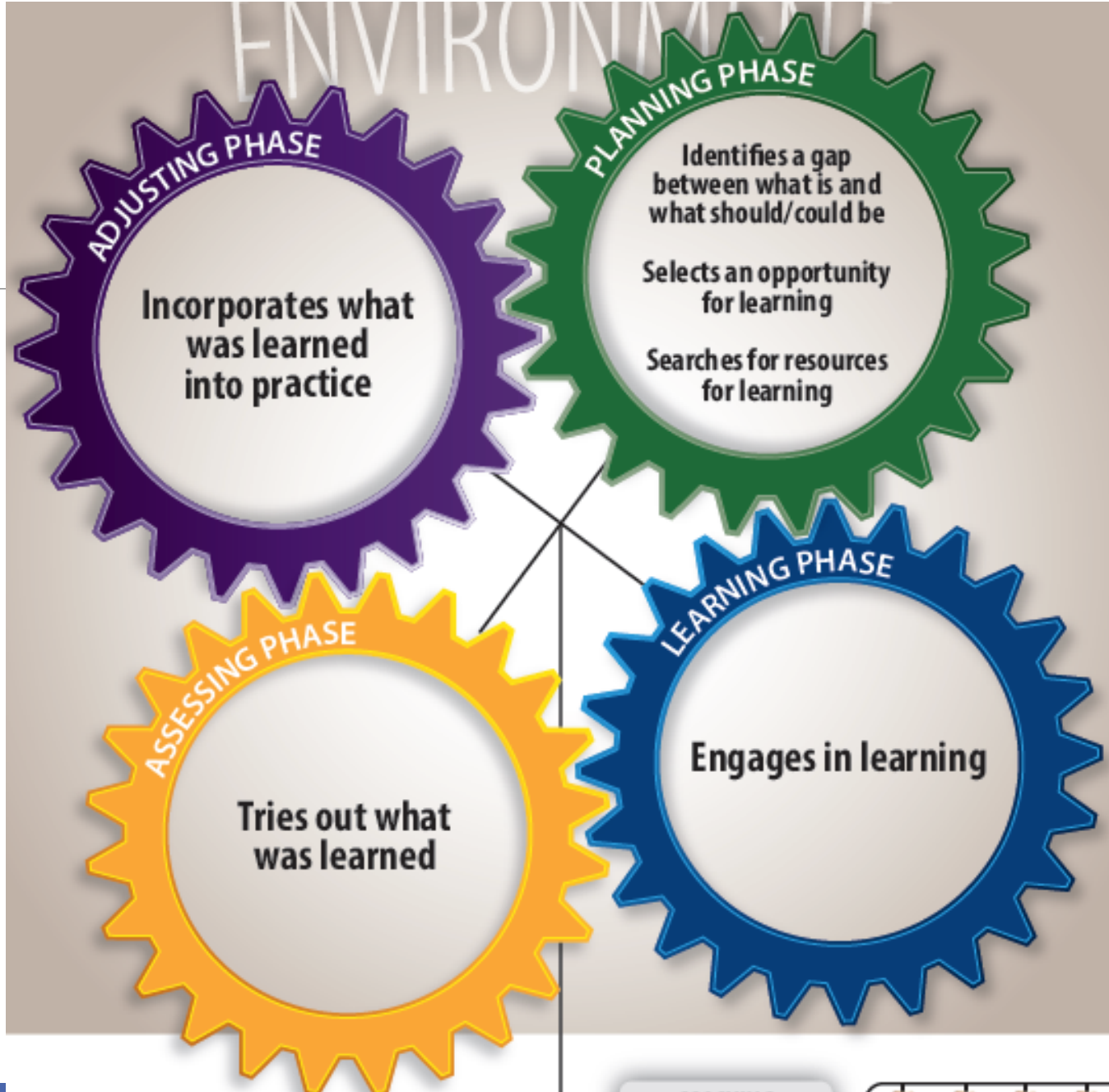
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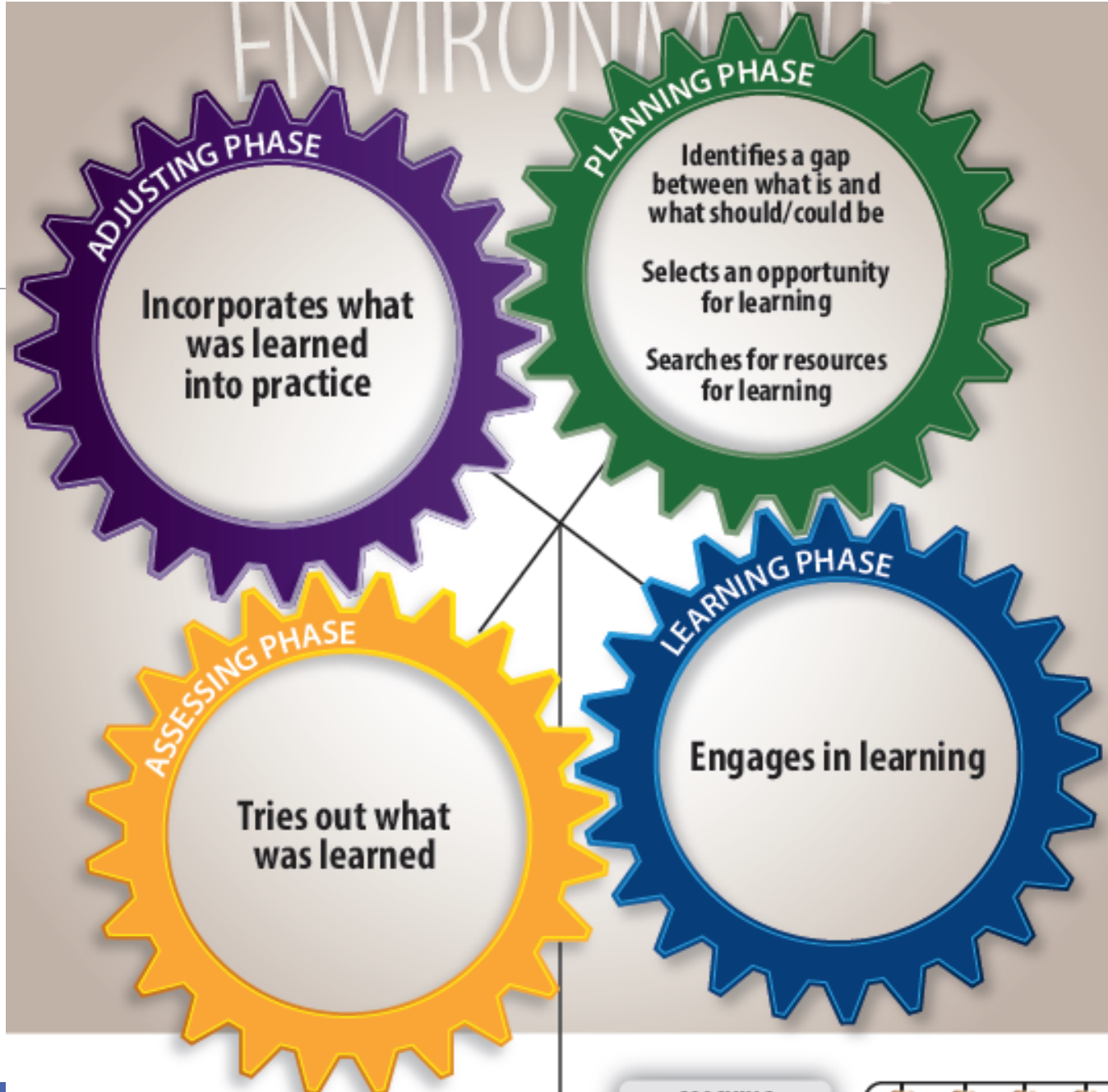


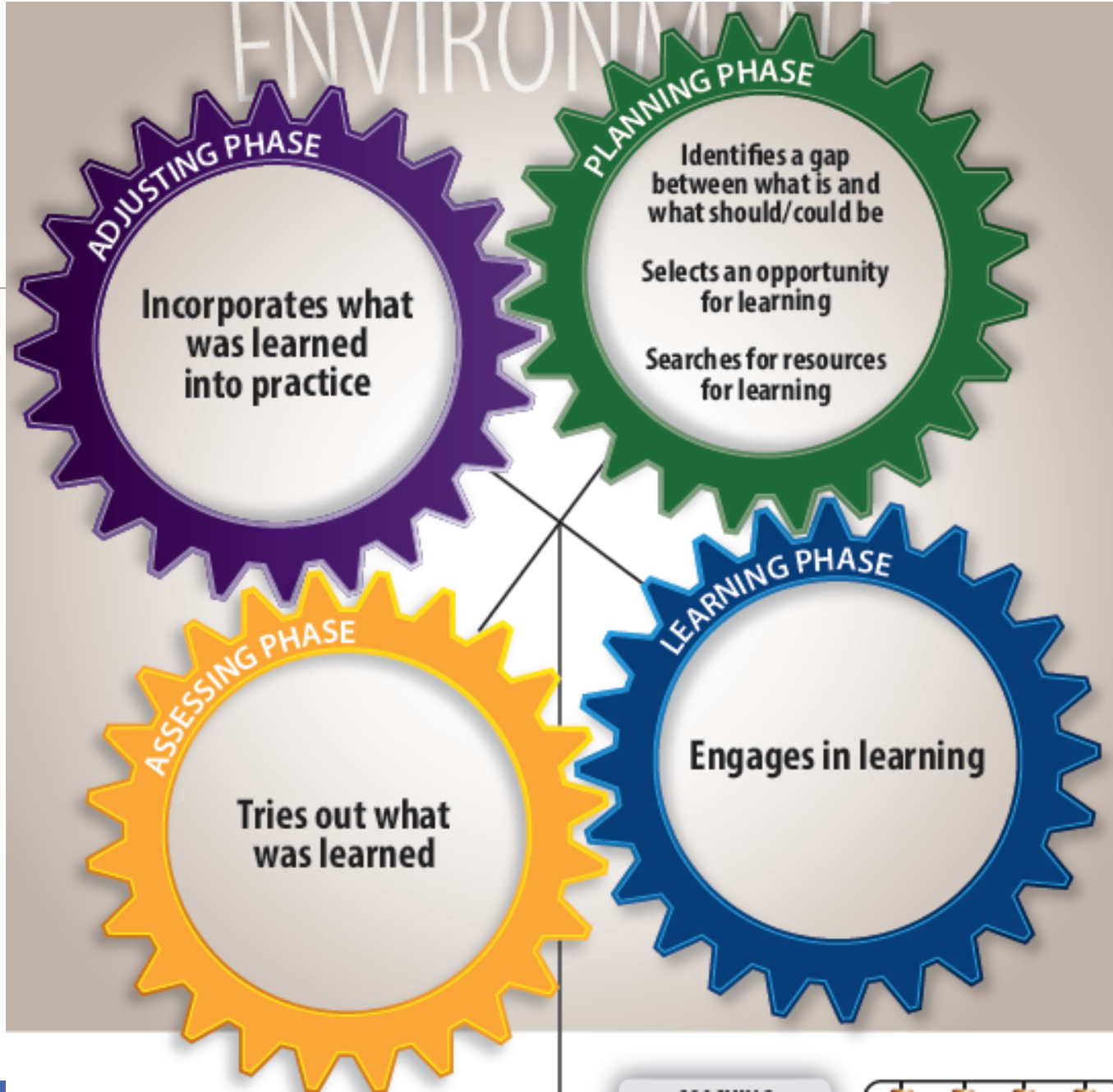


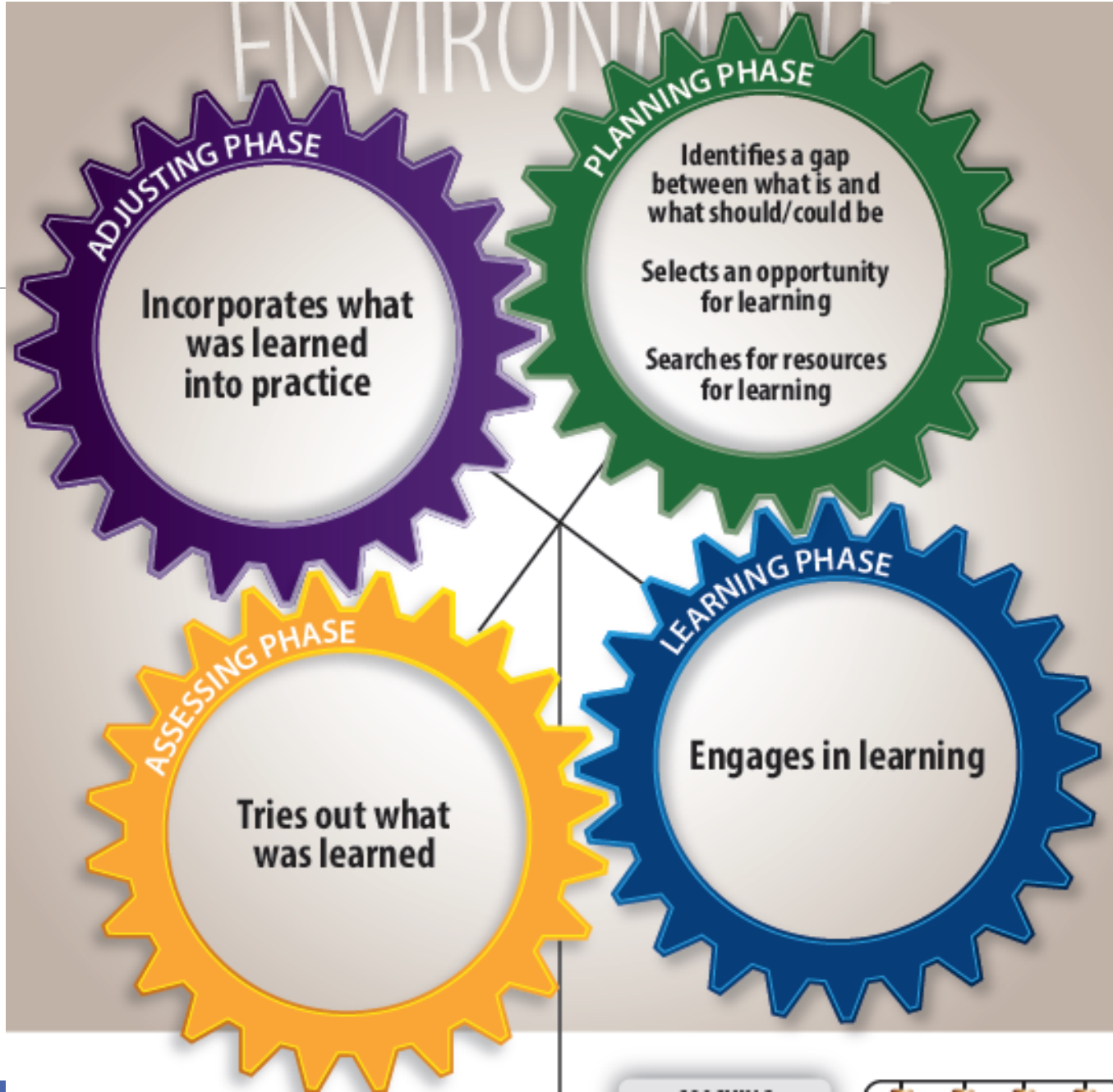




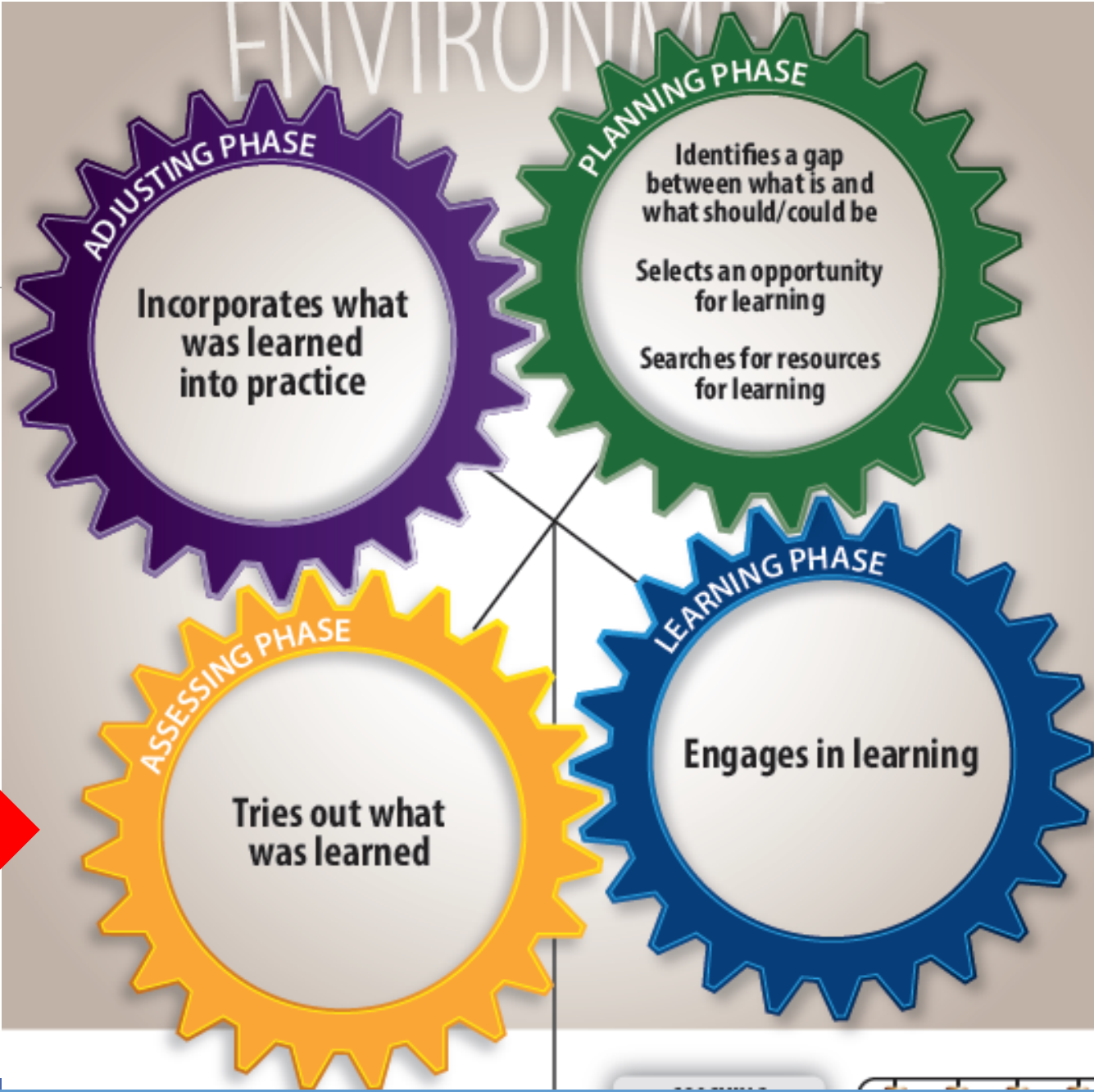




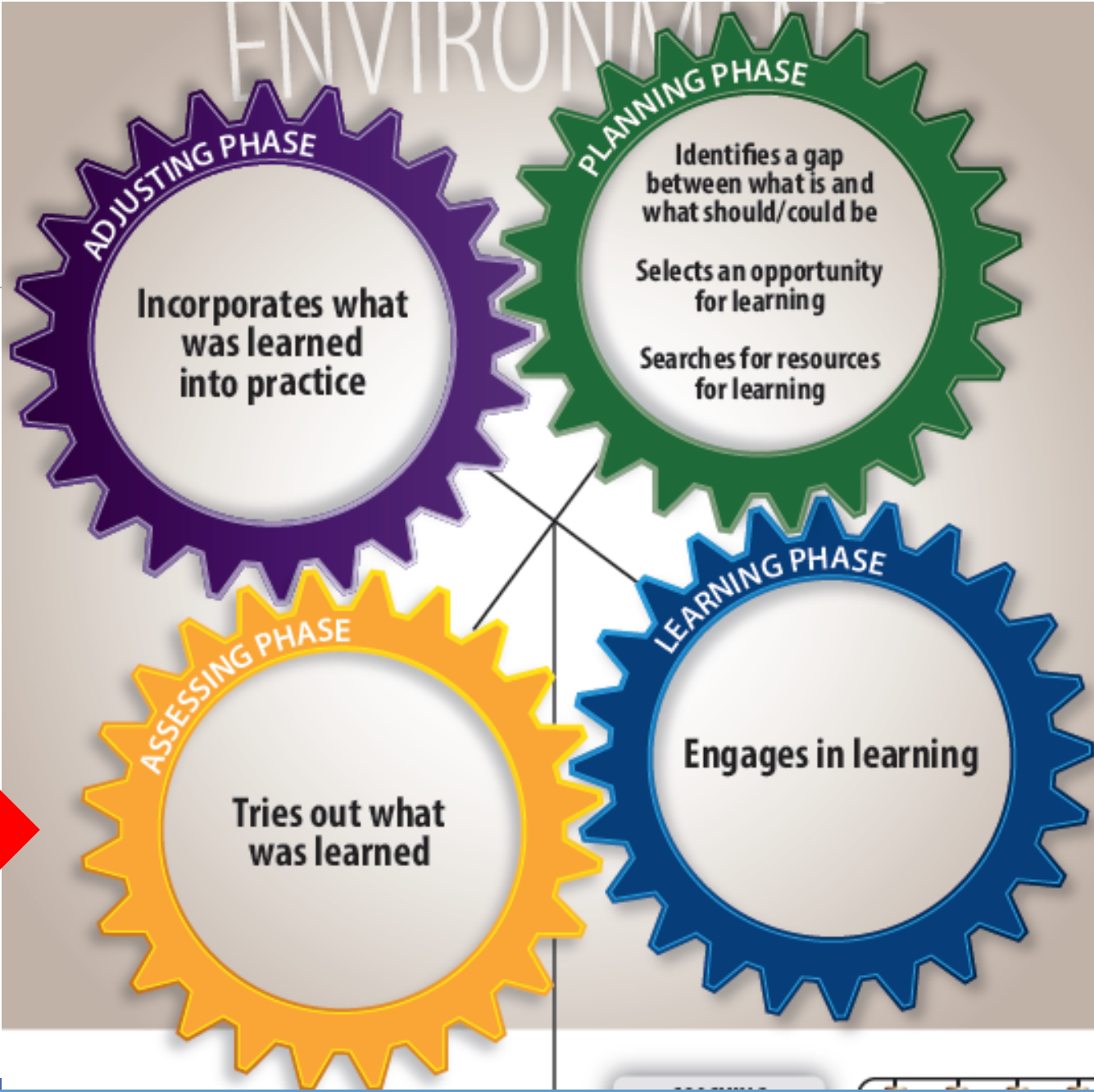




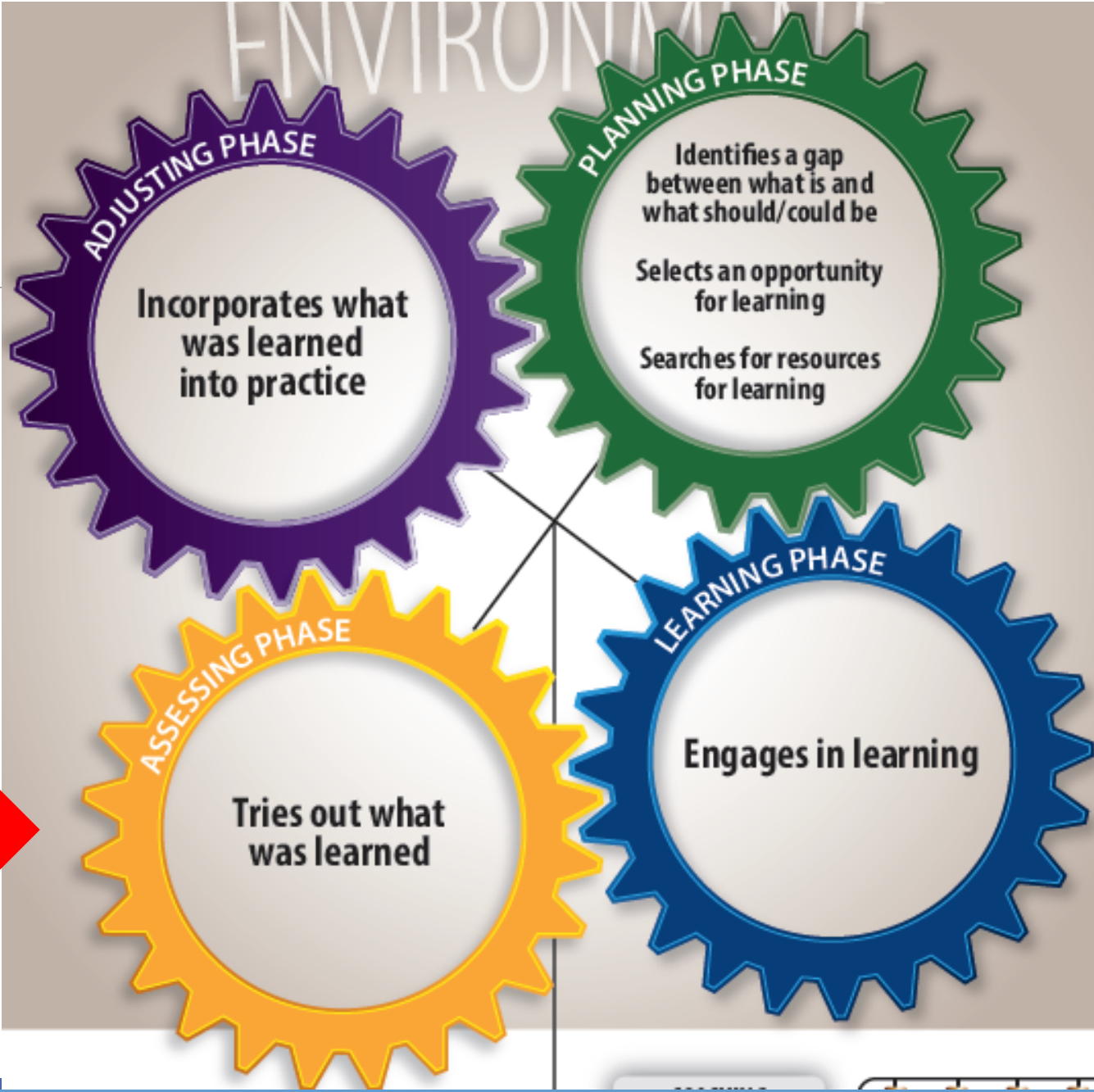
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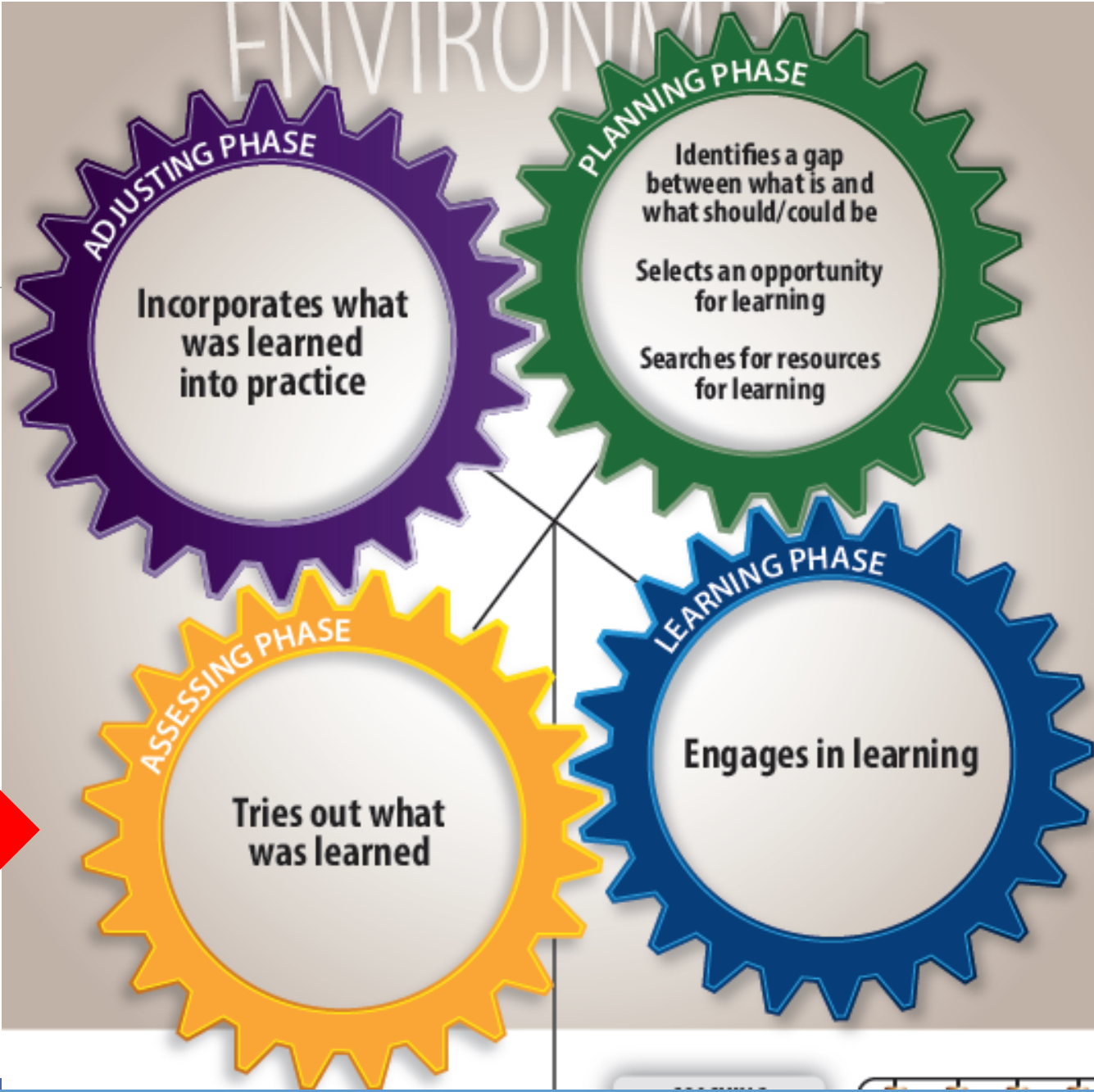
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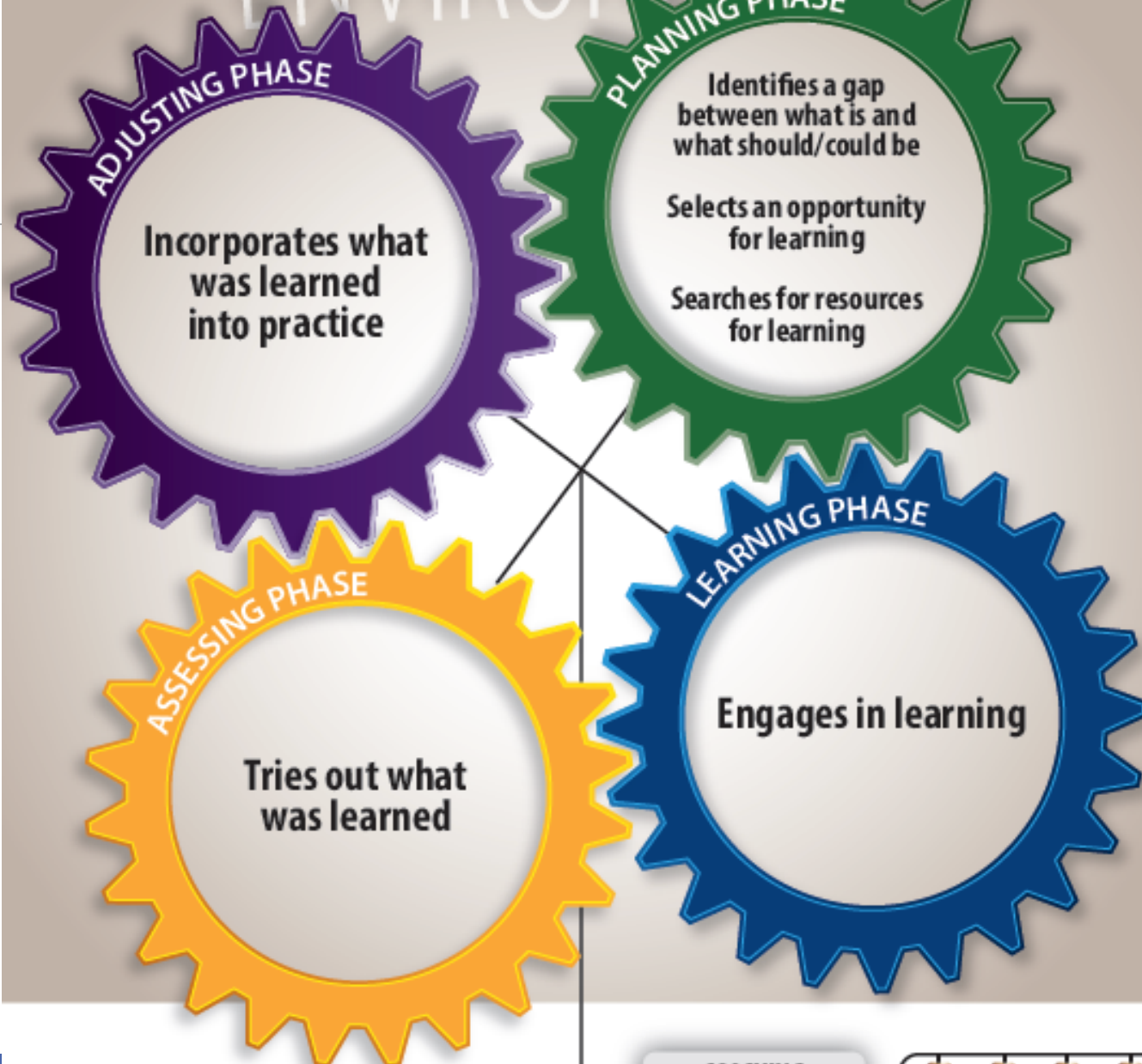
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Conclusion

- The purpose of this presentation was to describe a model for a Master Adaptive Learner.
- The model was developed to help medical students develop the skills associated with adaptive expertise in clinical reasoning and management.
- A begin-with-the-end-in-mind approach was used: the model was based on the MAL target goal: an expert clinician who had developed adaptive expertise in clinical reasoning.
- It is hoped that medical educators would use the model to create developmentally appropriate learning opportunities for medical students using competencies and related milestones.
- A text has been created to help medical educators.

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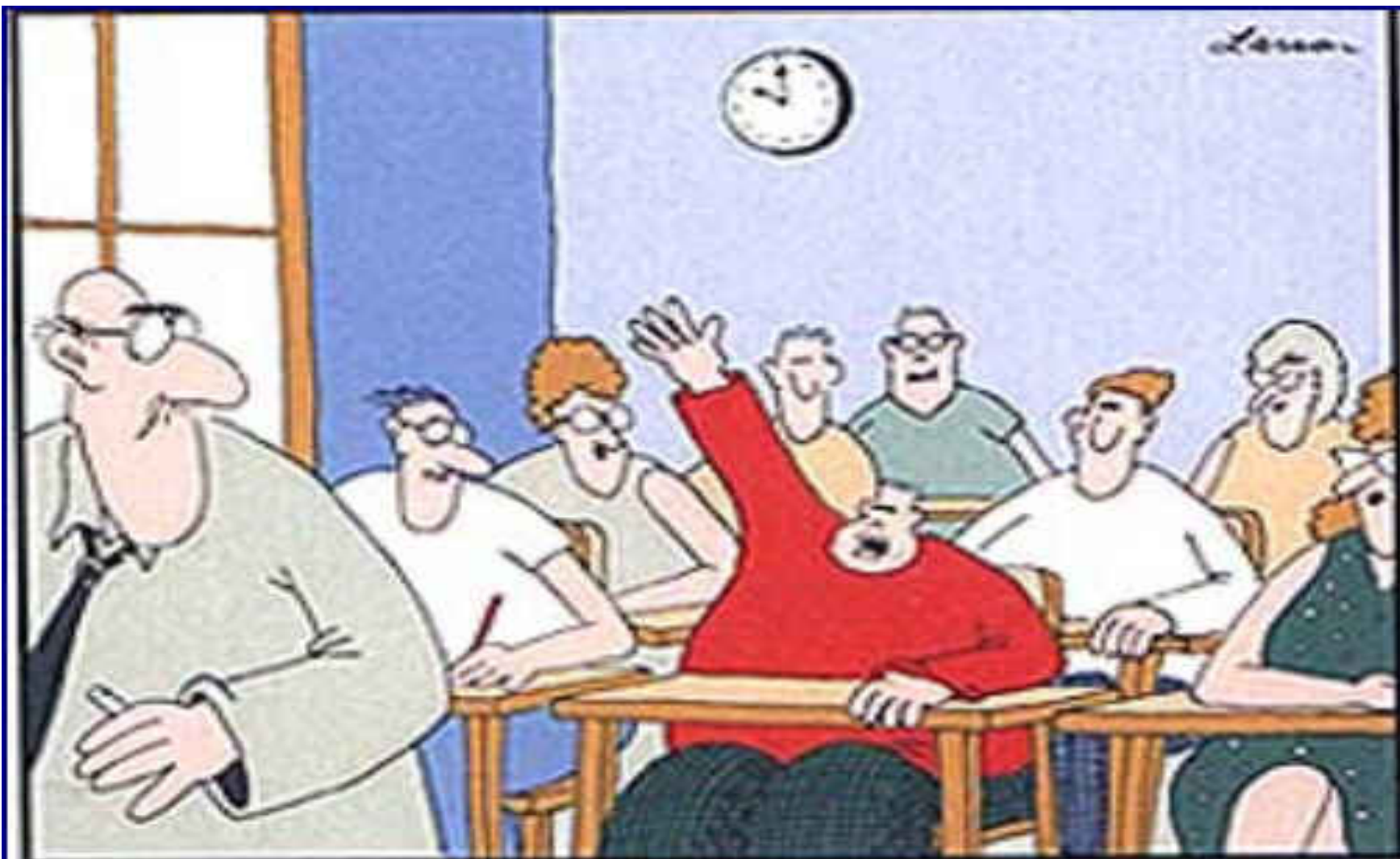
THE MASTER ADAPTIVE LEARNER

The AMA MedEd
Innovation Series



Conclusion

- The essence of the skills of a Master Adaptive Learner is adaptability, the capability to be flexible and willing to change in the practice setting.
- A key appears to be “preparation for future learning”
 - Concurrent training on the foundational biomedical concepts and clinical knowledge
 - Increasingly challenging opportunities to practice shifting from routinized approaches to innovative ones..
- Goal: help clinicians manage both routine patients efficiently and accurately through pattern recognition and develop more innovative approaches for complex patients.
- Is there a role in CME/CPD for the concept of Master Adaptive Learner?



“May I be excused? My brain is full.”