

*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”

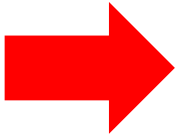
- To address this challenge, clinicians must be adaptive.
- They must learn to navigate in situations where they are at the edge of their existing knowledge.
- Clinicians who function as “*routine*” experts *rely on what they have learned* to solve problems; they become very efficient and proficient 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?

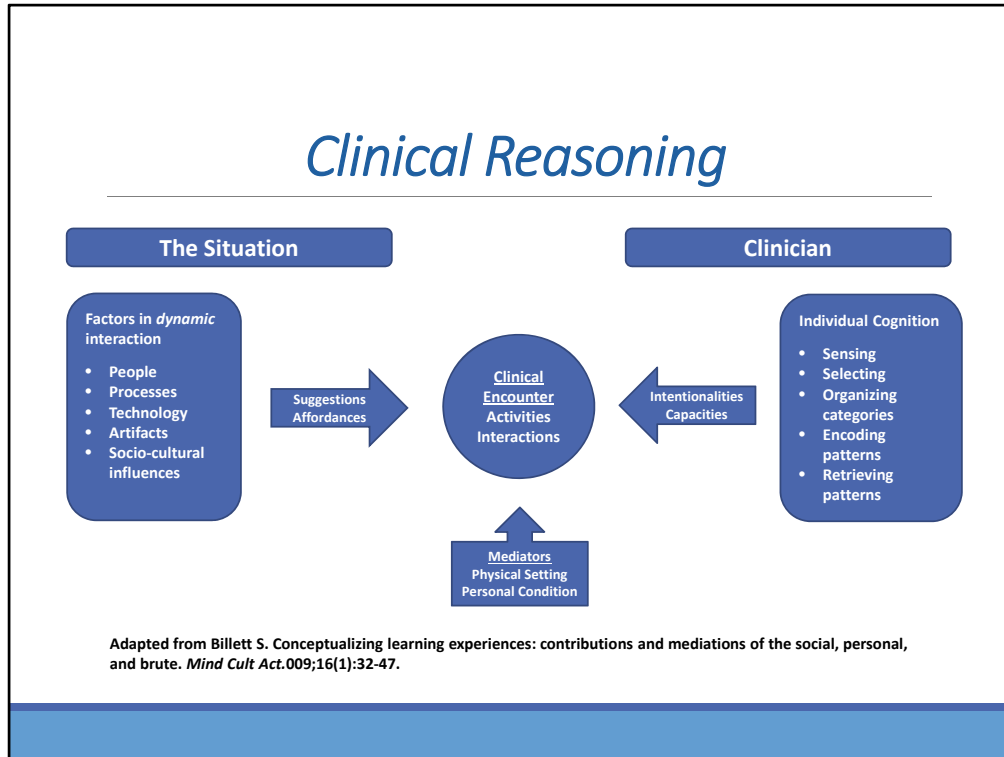
- A Master Adaptive Learner has developed the expertise to
 - recognize that a current approach to managing a group of patients is not working.
 - learn-in-practice a new approach to address a novel presentation.
- A Master Adaptive Learner has been prepared for future learning by having a strong foundation 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.

- As a Master Adaptive Learner Dr. Lerner has developed **expertise** in clinical reasoning to
 - Recognize when a current approach to managing a group of patients is not working;
 - Innovate an approach for a novel presentation.
- One of the important objectives of this session today is to understand how she developed this expertise.
- First, we need to know about clinical reasoning.
- Unfortunately, a consensus definition of clinical reasoning does not exist.
- So I will use a synthesis of situated cognition and social constructivism (sorry for the swear words!) to describe what we think takes place in clinical reasoning.



This graphic shows that, in a clinical encounter, a physician engages in a dynamic contextual interaction with

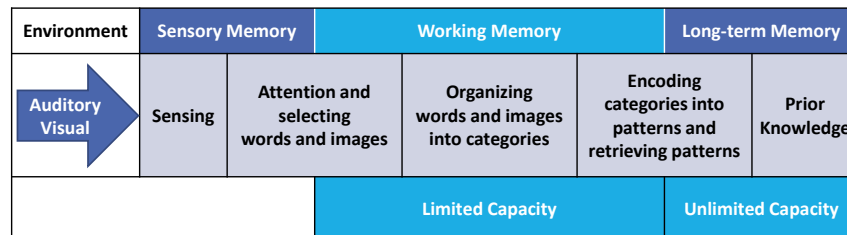
- People – Processes – Technologies – Artifacts - Socio-cultural influences

that are mediated by the physical setting and the physician’s condition and the physical setting.

Discussion of how the aspects of situation impact the clinical encounter are beyond the scope of this presentation. But that impact is important and will be pursued in future work.

What concerns us today is the clinical reasoning of Dr. Lerner.

What is going on during clinical reasoning?



In the clinical reasoning process, a physician's formal learning and experience shape her perception of a patient's presenting information in the form of auditory and visual images in sensory memory before moving to working memory.

A mental representation of the patient's condition will emerge in working memory.

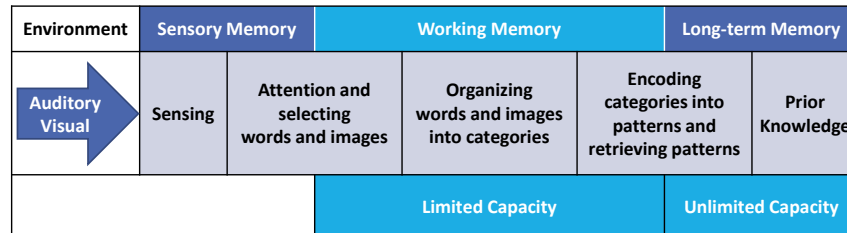
This mental representation guides further information acquisition, either from the patient or resources afforded by the practice environment.

A clinician will use the "new" information obtained in this way to revise the mental representation until she is confident that it supports an actionable diagnosis and/or management plan.

The actionable diagnosis and/or management plan usually draws on patterns (illness scripts) that are stored in long-term memory.

But in some cases, patterns do not exist or are incomplete.

What is going on during clinical reasoning?

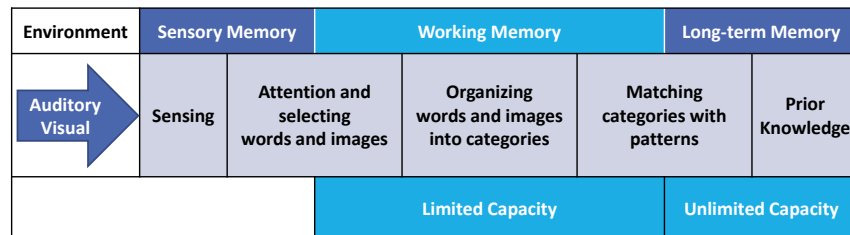


On any given day, most of Dr. Lerner's patients are return patients whose needs are for reinforcement of current management strategies or minor adjustments that can be made due to improvements in health status measures.

Other adjustments are needed for patients who are not following their management strategies as completely as they might.

For the most part, new patients fall into established management strategies.

What is going on during clinical reasoning?



Novel presentation

Absence of expected outcomes

Does not match

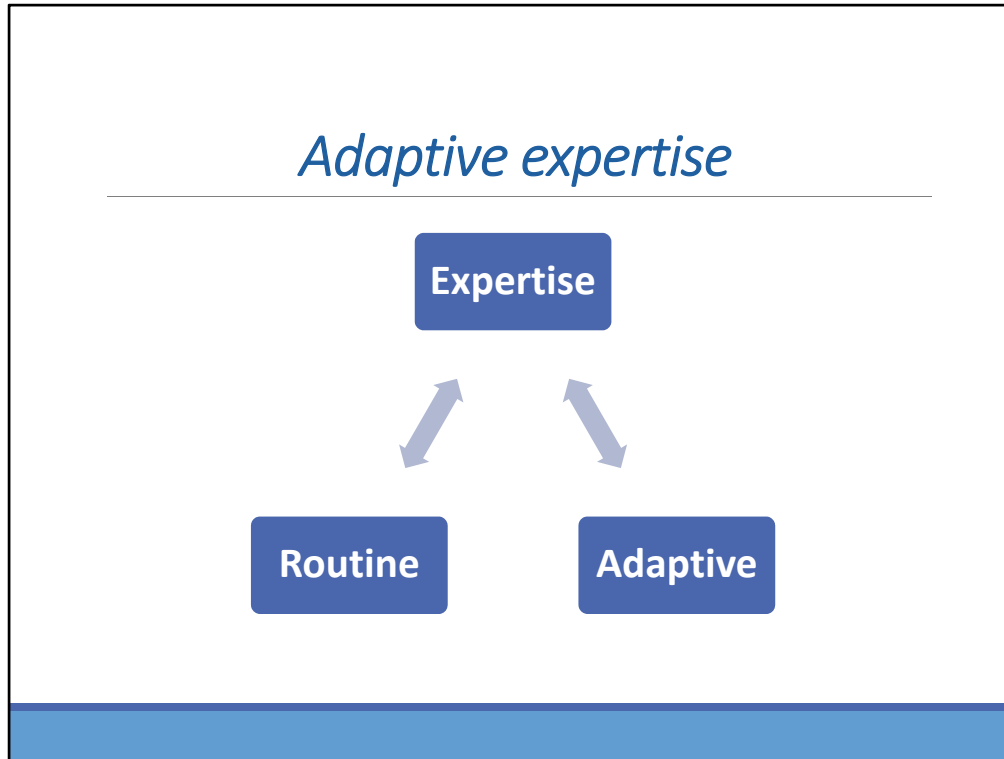
But there is an occasional return patient with multiple co-morbidities is not doing well on a management strategy that has worked for other similar patients

Or an occasional new patient presents as a seemingly unsolvable puzzle.

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.

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- Japanese educators Hatano and Inagaki have provided an important perspective of adaptability by drawing a distinction between expertise that is “routine” and expertise that is “adaptive”.
- An individual who demonstrates “routine” expertise has mastered approaches to clinical reasoning and procedures in her field to such an extent that she has become highly efficient and accurate performing them, even appearing to perform them automatically and without “thinking” about what she is doing.
- On the other hand, an individual who demonstrates “adaptive” expertise has also developed a **conceptual understanding** about clinical reasoning and procedures in her field that enables her to move beyond routine expertise to innovate, creating new approaches to clinical reasoning and procedures that she can use to effectively address unfamiliar circumstances of her patients.

Developing adaptive expertise

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

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.

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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.

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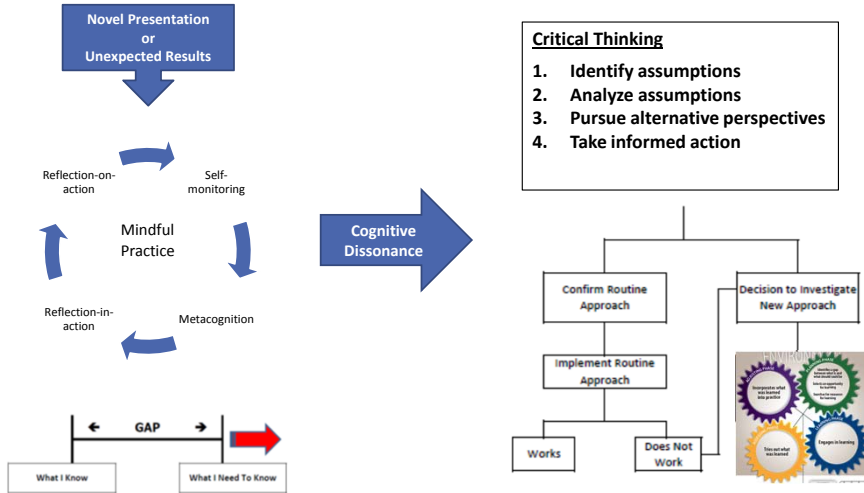
Preparation for future learning

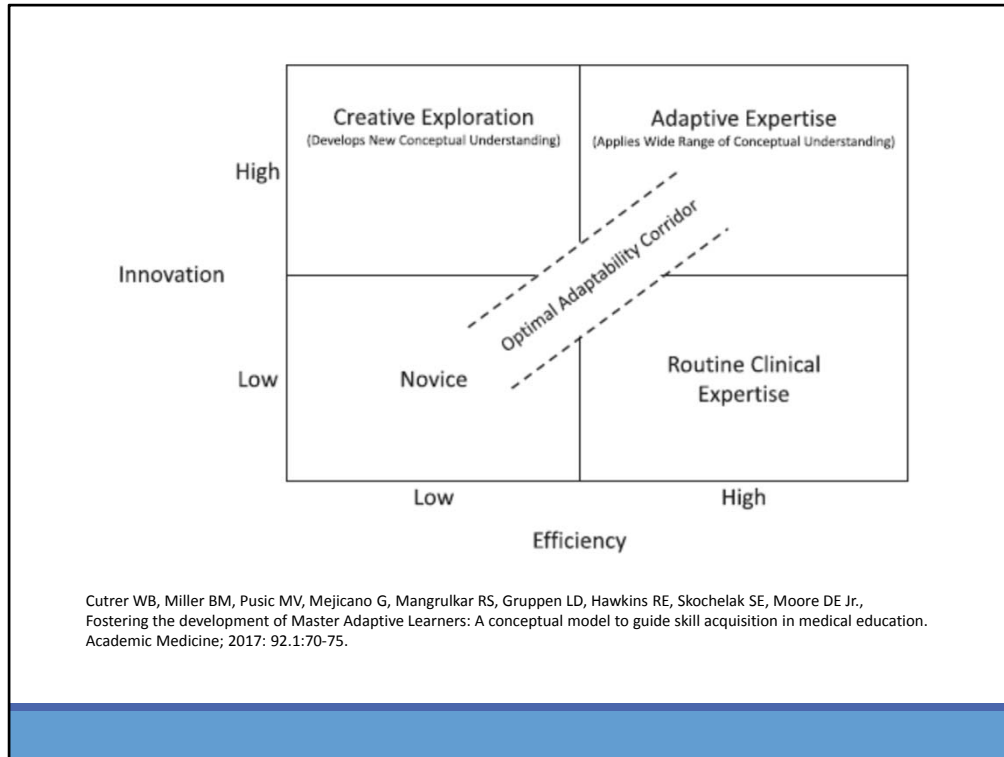
- In some cases, however, a patient's clinical presentation may activate a mental representation of a specific disease quickly, but the diagnosis and/or management plan pursued by a physician was not effective.
- In other cases, a patient's clinical presentation might not activate a workable disease 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 ...

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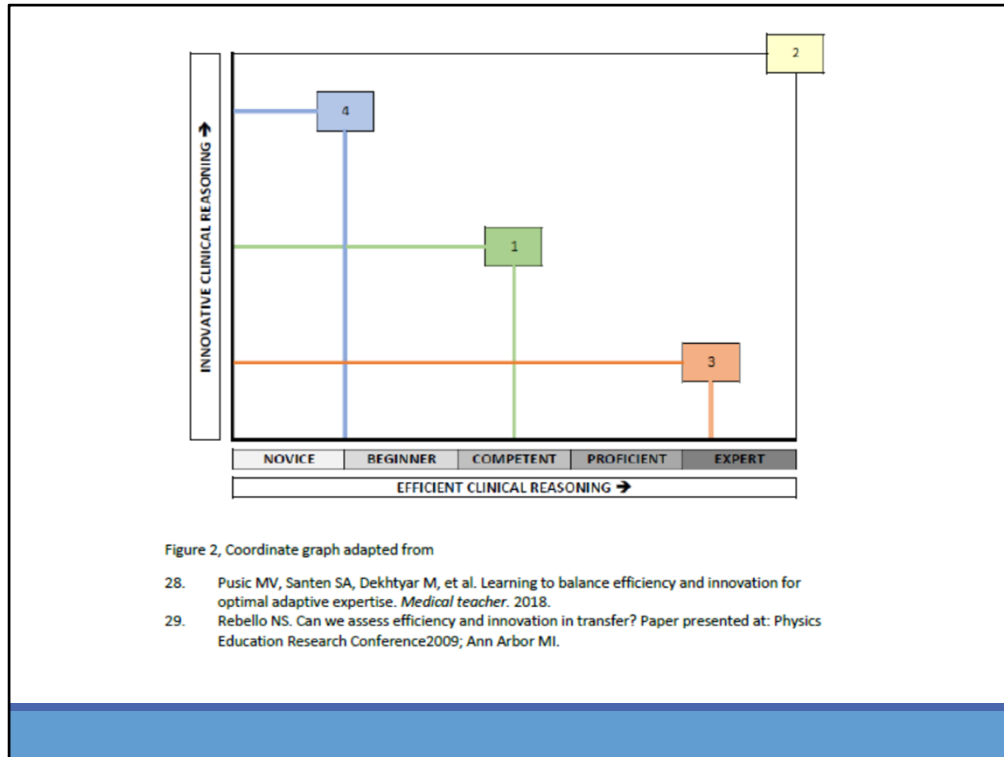


Beginning the Journey of a Master Adaptive Learner

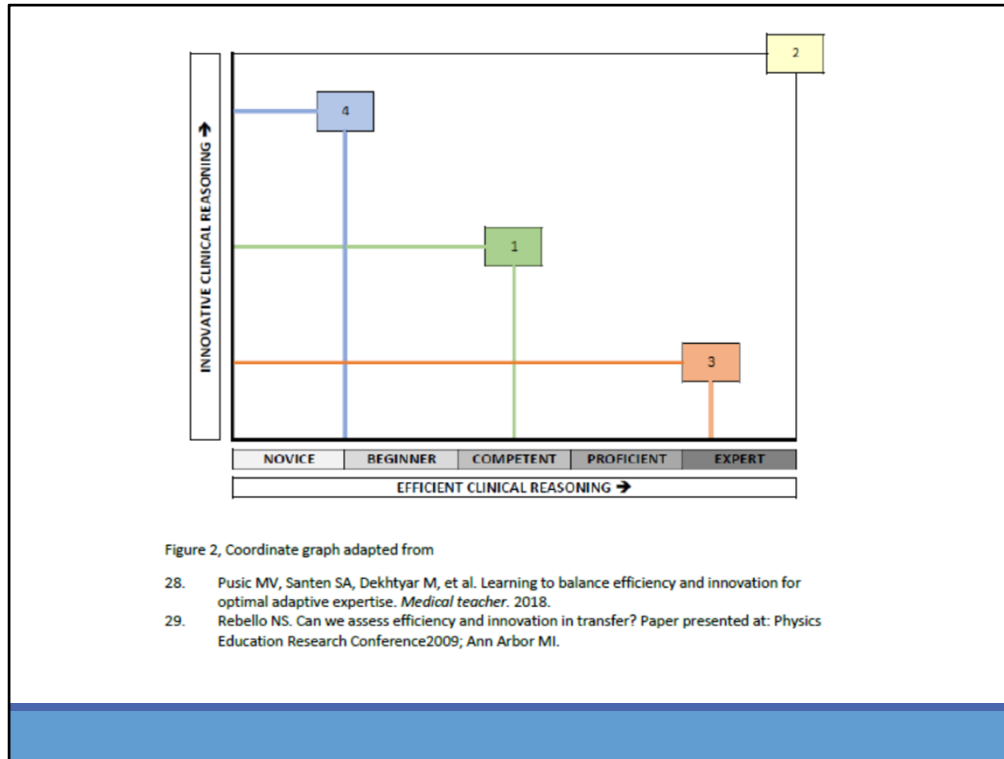




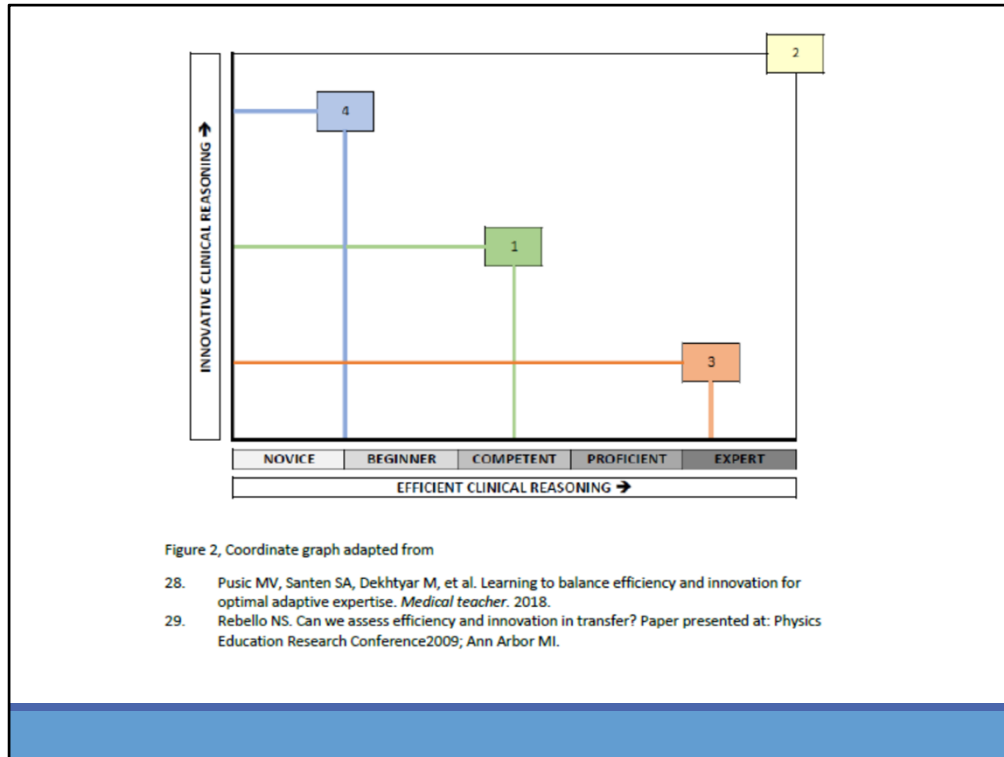
- People who are optimally adaptive can rearrange their thinking and reconceptualize their environments to reconstruct problems and generate and use new knowledge based on the circumstances that they are working in.
- An adaptive expert reconstructs problems and generates and uses new knowledge by balancing efficiency and innovation within an Optimal Adaptability Corridor (OAC).
- A novice primarily works in the lower left quadrant.
- A routine clinical expert primarily works in the lower right quadrant
- Adaptive – upper right quadrant
- Creative exploration – upper left quadrant



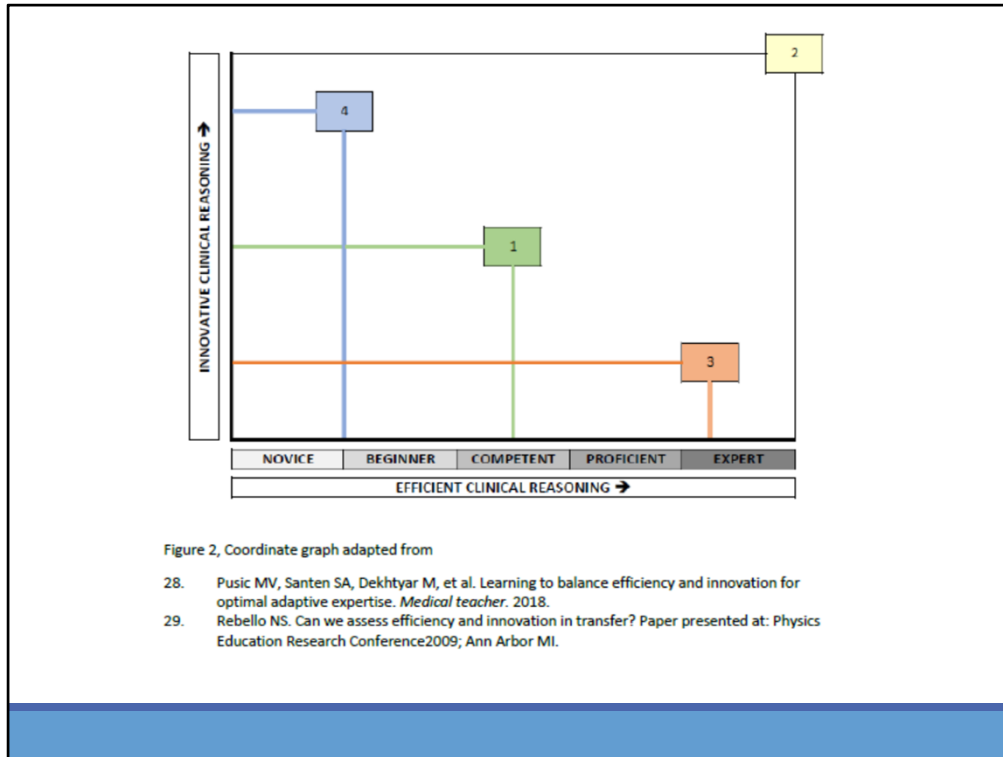
- It appears to be more likely that the adaptability that a clinician demonstrates can be represented more broadly by the intersection of two lines on a coordinate graph
 - one drawn from a point on the x-axis representing a clinician's efficient clinical reasoning capability and
 - another line drawn from the y-axis representing the same clinician's innovative clinical reasoning capability,
 - as depicted in this figure.
- Each is contingent on a patient's presentation and the socio-cultural circumstances of the patient and the practice.



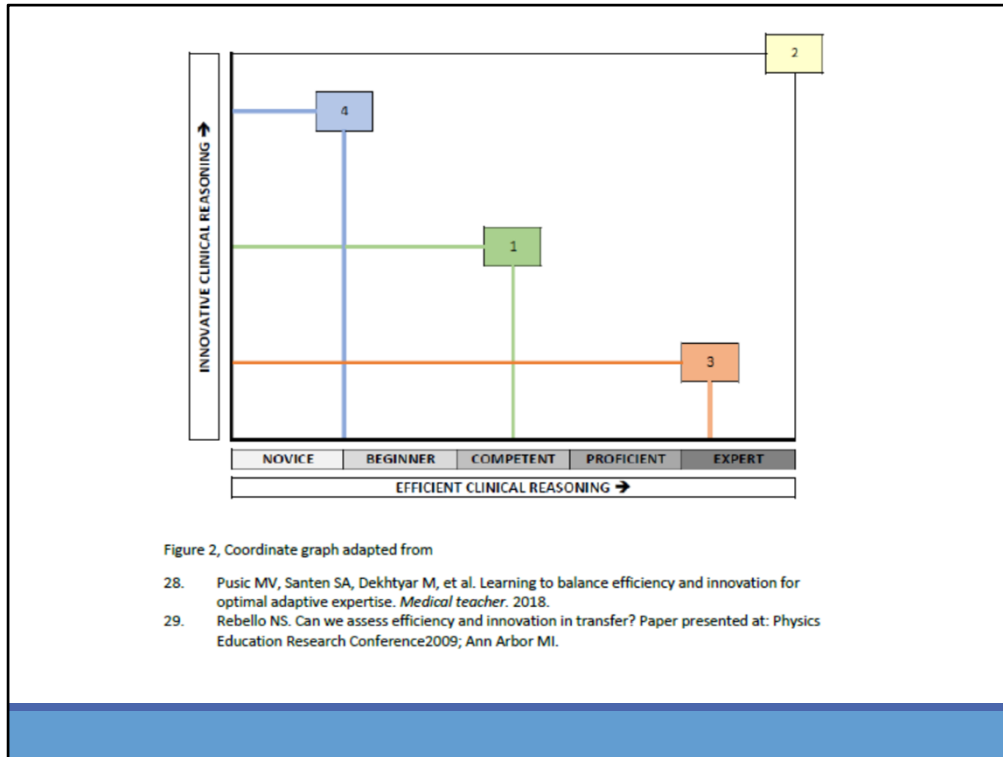
- A clinician demonstrating adaptive expertise in his work does not impose either an innovative or routine solution on a patient but instead navigates a clinical encounter as necessary, drawing on capabilities that are characterized by either efficient clinical reasoning (horizontal axis) or innovative clinical reasoning (vertical axis) as needed.
- This judicious determination of the “as needed”, matching approaches and resources to the patient, is the key expertise.
- In a clinical encounter where a mental representation is retrieved efficiently based on a patient’s presentation (routine expertise), the solution is known and can be located along the horizontal axis based on the training and experience of the clinician.



- In those cases when the mental representation is incompletely or not retrieved, a clinician would instead draw on his more resource-intensive innovative capability located at a point on the vertical axis.
- Her clinical reasoning performance would be depicted as the optimal tradeoff of the efficient clinical reasoning capabilities and innovative clinical reasoning capabilities.
- For a clinician to balance efficient with innovative clinical reasoning in performance, she needs to have been prepared for future learning by developing deep conceptual understanding of well-organized, fluently accessible sets of knowledge and skills that are represented on the efficiency dimension.



- In the figure, four examples of adaptability are depicted. Examples 1 and 2 most closely represent where a clinician has developed “equal” or “close-to-equal” capabilities in efficient and innovative clinical reasoning.
- This is an ideal situation in which the training a clinician would have received balanced the development of the two capabilities and, importantly, allowed the trainee the opportunity to practice balancing them.
- Example 1 could be a resident after “ideal training”; example 2 could be an experienced clinician who through “ideal training” and learning-in-practice would have developed “ideal adaptive expertise”.



- It is more likely, however, that the performance of most clinicians would reflect variants of examples 3 and 4.
- There are multiple intersection points all contingent on a clinician’s capabilities and a patient’s presentation and the socio-cultural circumstances.
- Example 3 could be an experienced clinician who has developed significant routine expertise.
- Example 4 could be a clinician who is a “pure innovator” and spends most of his time in the research lab but sees patient one afternoon a week where he has developed routine expertise in a very narrow area of patient care.

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.

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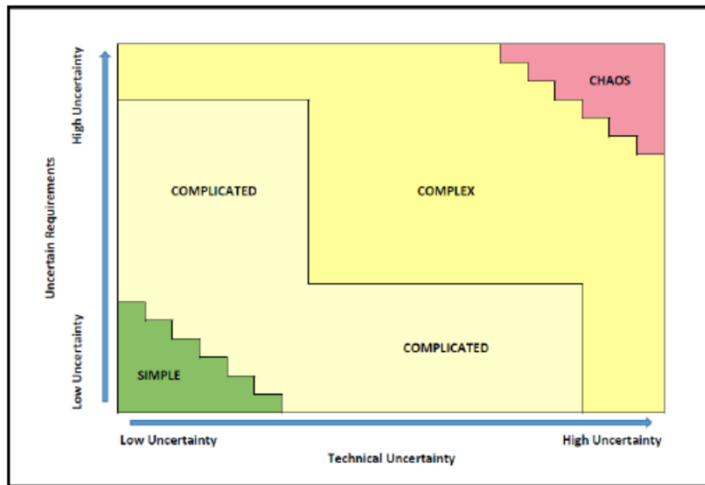


Figure 3, Stacey Complexity Model

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.

Metacognition provides a clinician with three complementary approaches to thinking that address uncertainty:

- metacognitive monitoring - focuses on the match between what a physician knows and can do and what is required in a clinical encounter
- metacognitive control - a form of critical thinking that analyzes the match or absence of a match
- predisposition to learn – when a match does not exist, cognitive dissonance results which, especially if enabled by a growth mindset, will lead to learning.

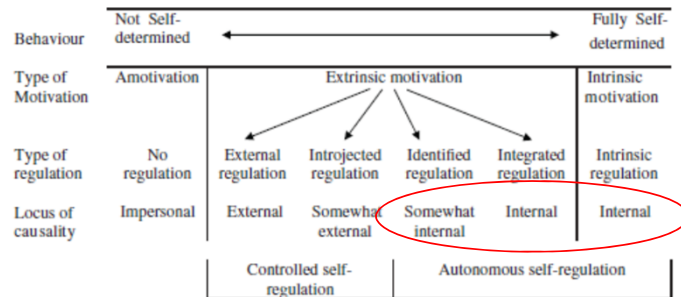
If what a physician knows and can do matches the requirements of the clinical encounter, the clinician can invoke a routine approach.

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.

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The continuum of motivation in Self-Determination Theory



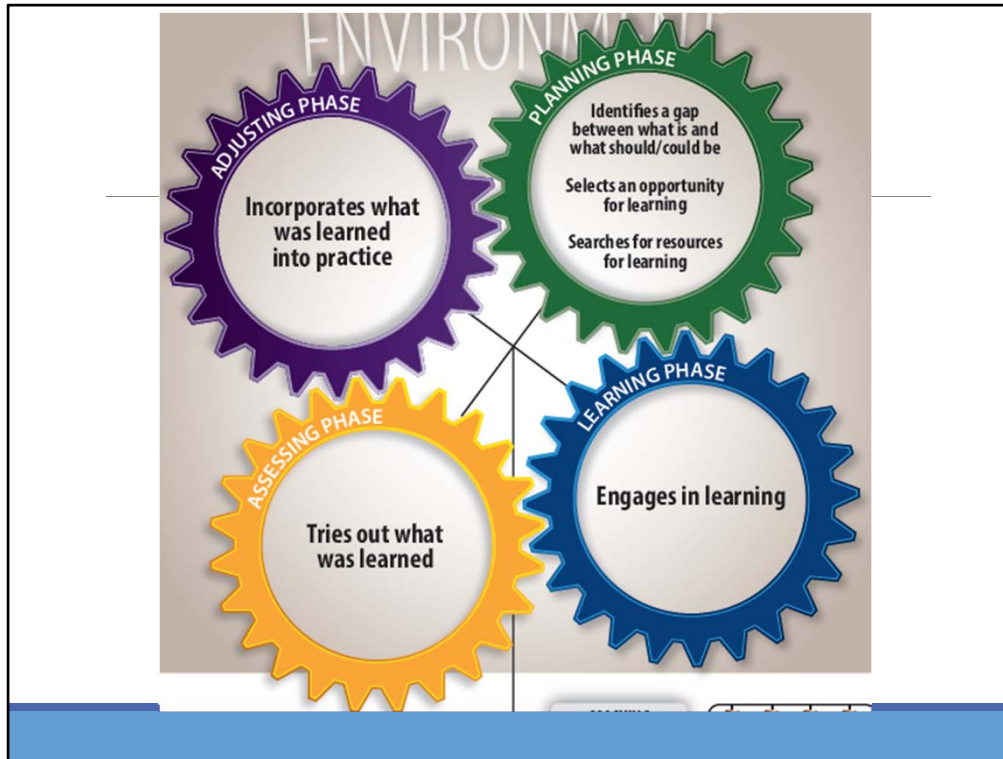
Adapted from Ryan RM, Deci EL 2000 in ten Cate OTJ, Kusurkar RA, Williams GE 2011

Motivation and Learning

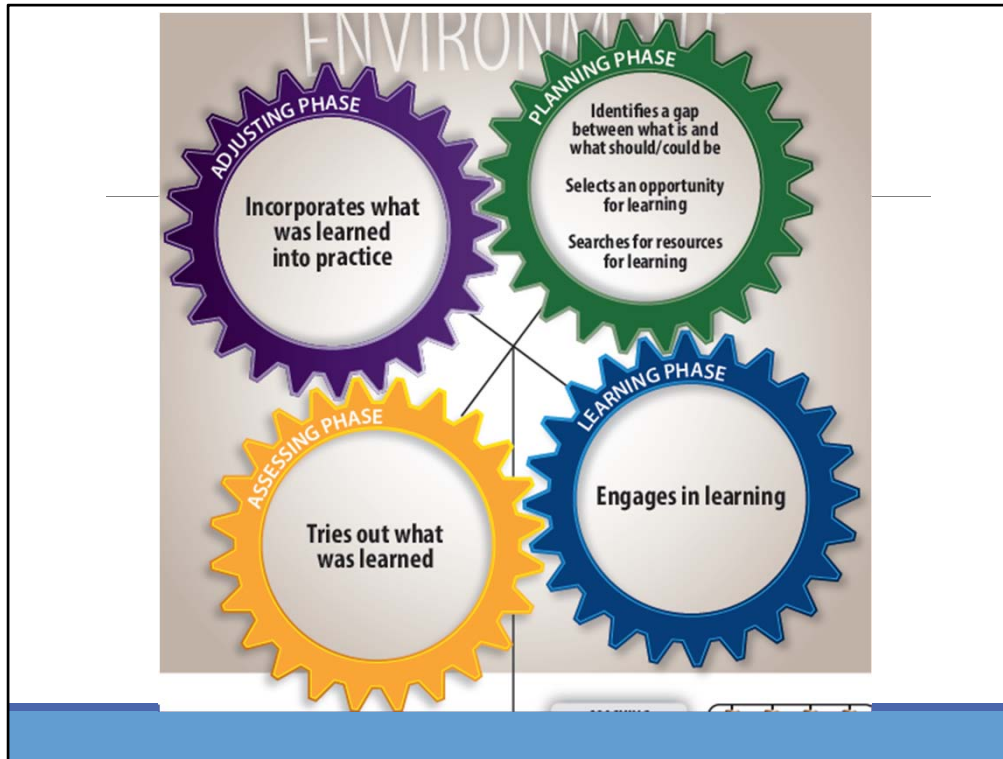
- Motivation is not enough to achieve the desired results of demanding learning projects; a volitional dimension must come into play to sustain an agent's effort toward a personal goal.
- Self-regulation, as a dynamic combination of strategies and will power (volition) is linked to success in academic 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

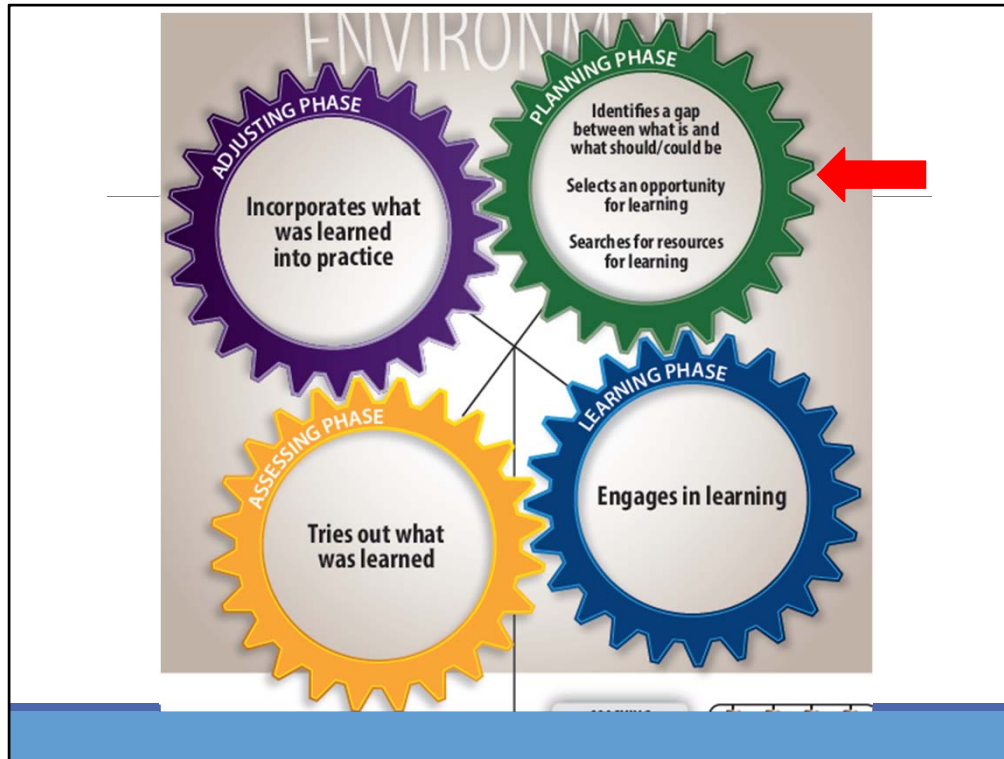
- The learning that a Master Adaptive Learner would pursue can be conceptualized as a combination of self-determination, self-regulation, and self-direction.
- Internal motivation, activated by cognitive dissonance, can be considered as the starting point of individual learning and change.
- Clinicians 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.



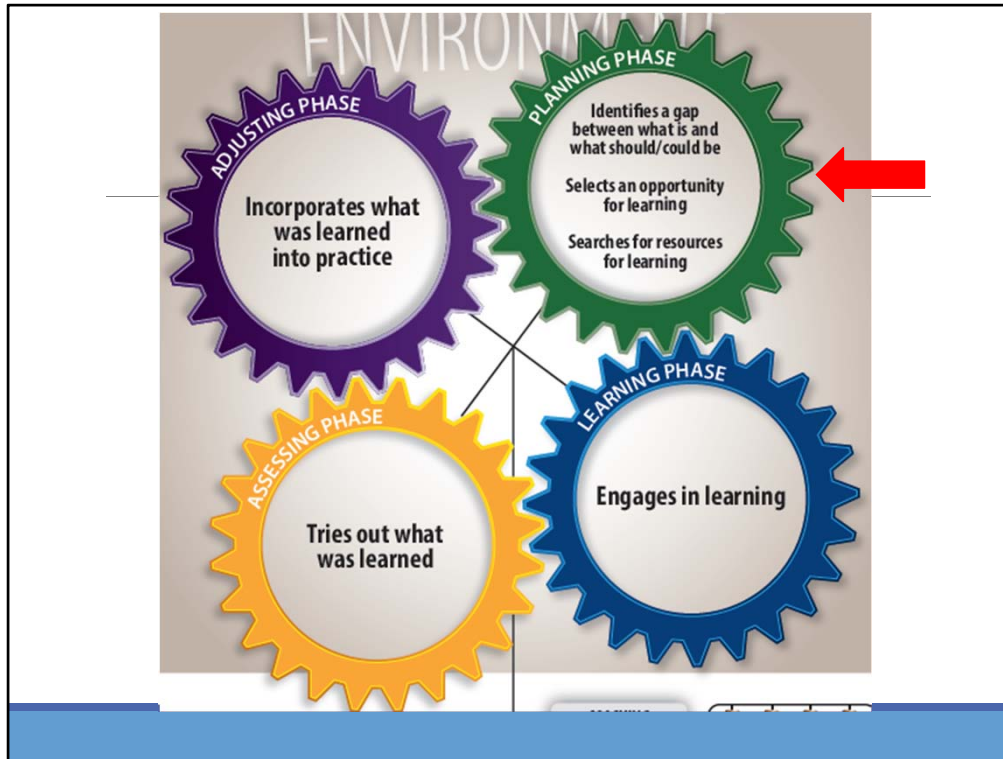
- As mentioned previously, Dr. Lerner's return patients need reinforcement of current management strategies or minor adjustments that reflect improvements in health status.
- Other adjustments are for patients who are not following their management strategies as completely as they should.
- An occasional return patient with multiple co-morbidities is not doing well on a management strategy that has worked for other, similar patients.
- For the most part, new patients fall into established management strategies, but an occasional new patient presents as a seemingly unsolvable puzzle.



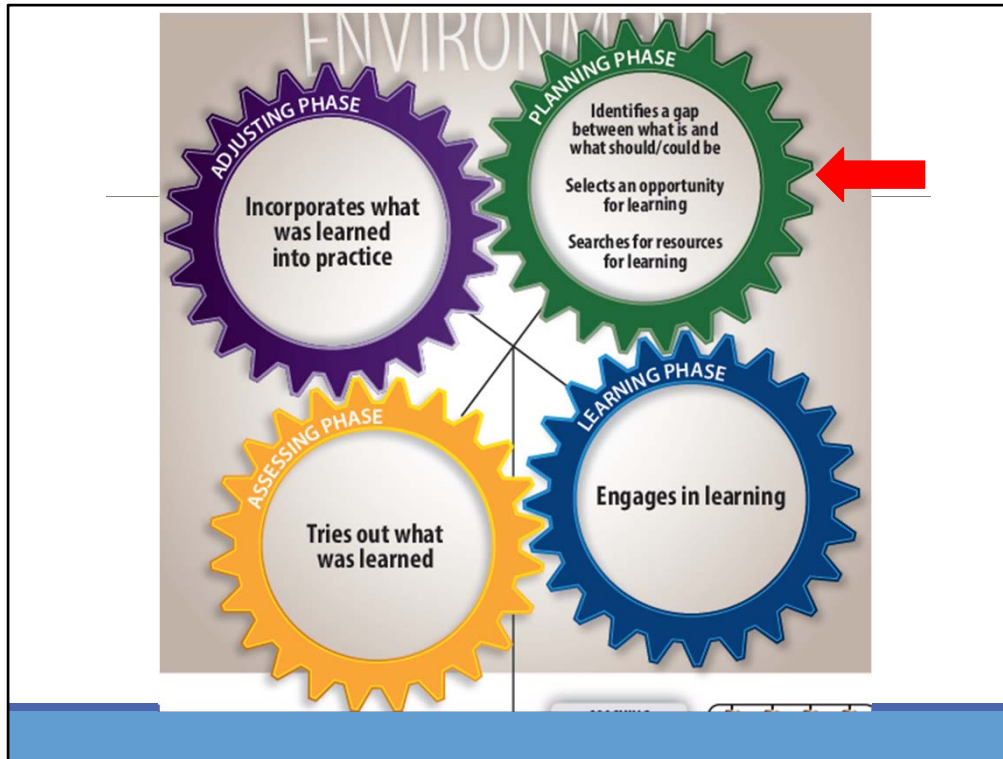
- Over her ten years in practice Dr. Lerner has developed routine approaches that address the needs of most of her patients.
- She has kept up to date with changes in diabetes care regularly consulting the annual supplement in the journal Diabetes Care and articles in several other diabetes and internal medicine journals.
- She is a frequent participant in grand rounds and patient care conferences at her hospital.
- Her hospital and practice are part of a clinically integrated network and the network's Quality Improvement and Patient Safety Office (QIPS) conducts regular performance improvement studies as part of the network's goal to provide the best possible care.



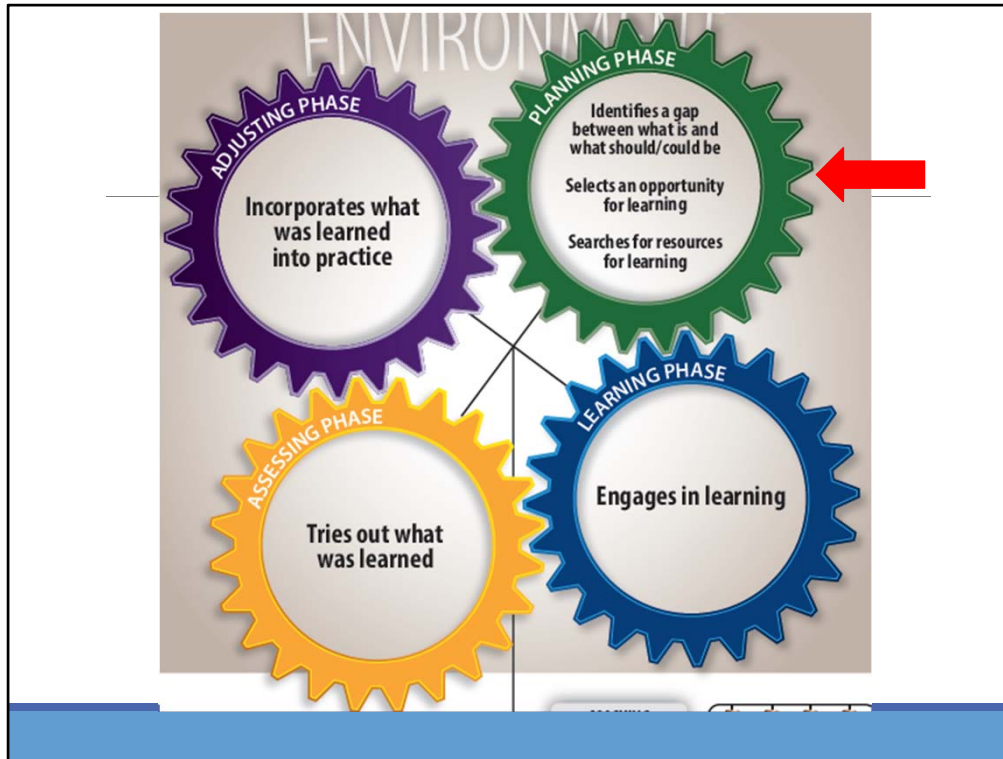
- The planning phase consists of recognizing a gap in practice, determining what needs to be learned, and creating a goal to guide learning activities.
- The planning phase began when Dr. Lerner sensed that something in her practice was “not right”.
- During a clinical encounter with John, a patient who has type 2 diabetes (T2D) and is obese, she reviewed his lab results and realized that he was not improving.
- Among other indicators, his HbA1c was considerably elevated.
- She wondered why he was not doing well on a management strategy that she was using routinely with other, similar patients.



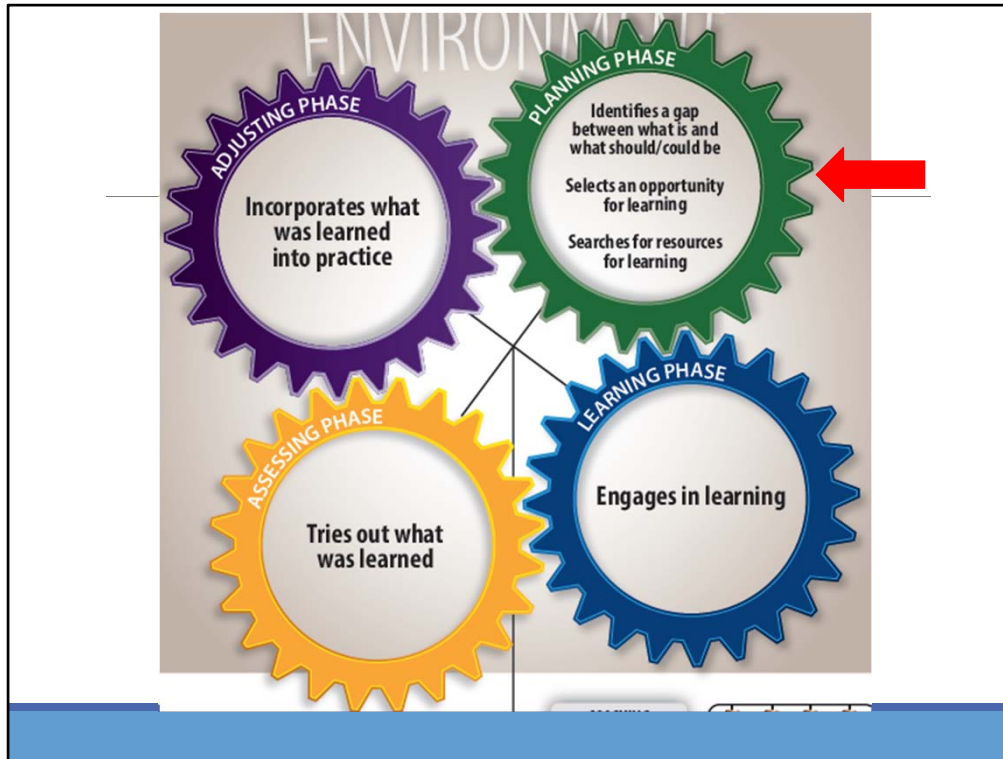
- The other patients seemed to be improving; their HbA1c values were better than John's.
- She was also confused about John's values because the approach that she was using was evidence-based having been developed with colleagues using the annual American Diabetes Association standards⁴⁰ and updated regularly.
- She had made minor adjustments in John's medication and emphasized more strongly than usual the importance of exercise and diet.
- As she entered her notes in the network's electronic health record, she wondered if there were other patients like John.



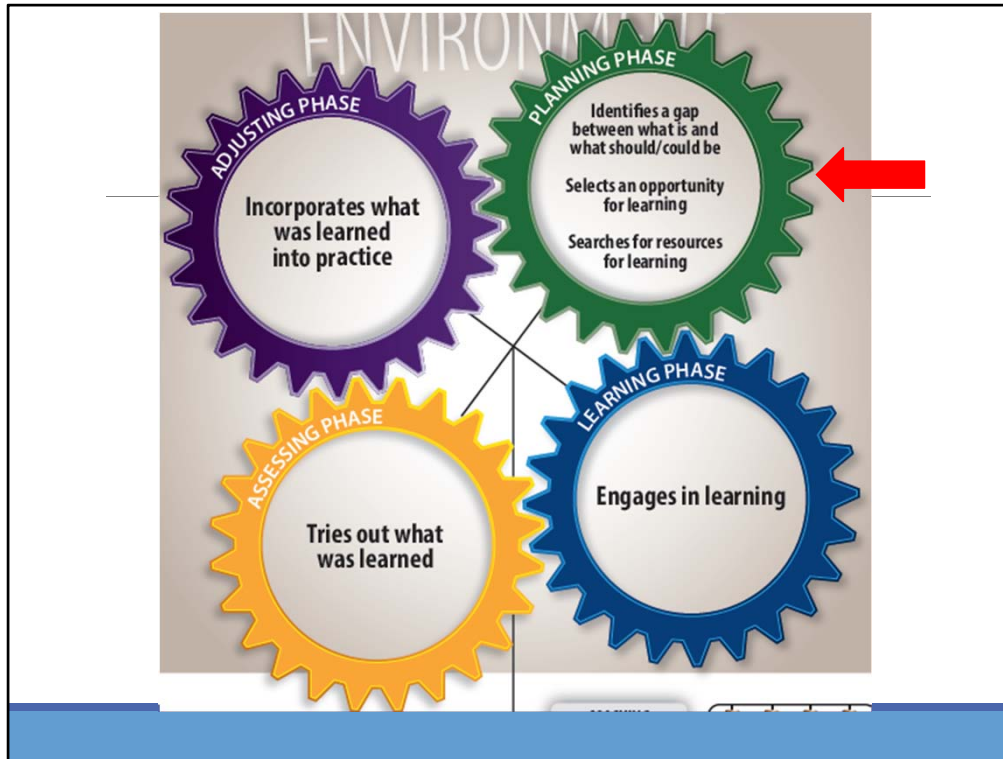
- Like all physicians, Dr. Lerner wants to provide the very best possible care to her patients.
- After she saw John, she was uncomfortable because what she thought was the correct approach to managing his diabetes and obesity was not working the way she expected.
- She wanted to find out if there were other patients like John. Several months ago, she participated in a performance review in another clinical area conducted by QIPS and was impressed with the data that were used in the study and the approach of QIPS staff.
- She asked QIPS staff to generate a report that summarized the health status of patients like John.
- The report indicated that there were many patients like John who were on the same treatment approach and whose HbA1c values were greater than 10.



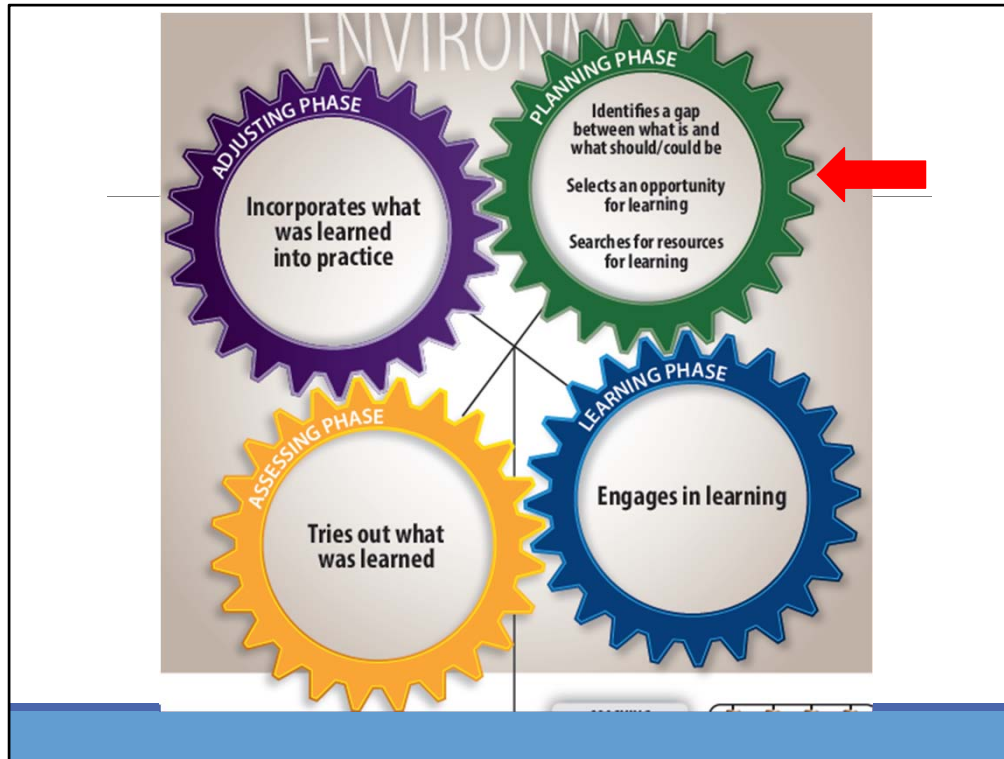
- The realization that there were more patients like John with sub-optimal outcomes transformed the uncomfortable feeling that Dr. Lerner experienced after John’s clinic visit into a stronger feeling that psychologists call “cognitive dissonance”.
- For Dr. Lerner, cognitive dissonance was a heightened discomfort that was the result of realizing that what she thought she was doing correctly to benefit a group of patients was contradicted by the less than optimal outcomes that she was seeing.
- She began to recognize there was a gap between what she was doing for patients like John and what she could or should be doing.
- Individuals who experience cognitive dissonance try to do something to reduce the discomfort.



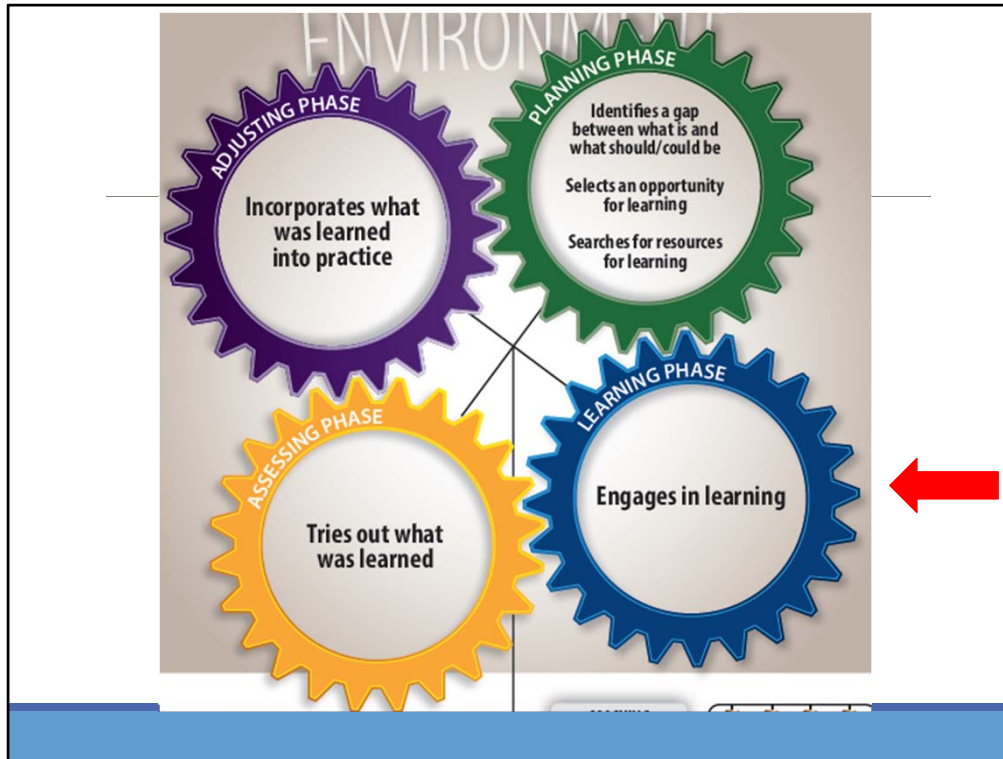
- Feedback from formal performance review can also highlight practice gaps for clinicians and cause cognitive dissonance. Developing a system for collecting this kind of external feedback is a kind of “informed self-assessment”.
- When Dr. Lerner realized that the dissonance that she was experiencing was the result of the ineffectiveness of the approach she was using with John and patients like him, she will want to know what approach she should use to produce more optimal outcomes.
- In this circumstance, Schön suggests that a clinician will try out a few things in practice to address the gap that created the cognitive dissonance, or surprise.



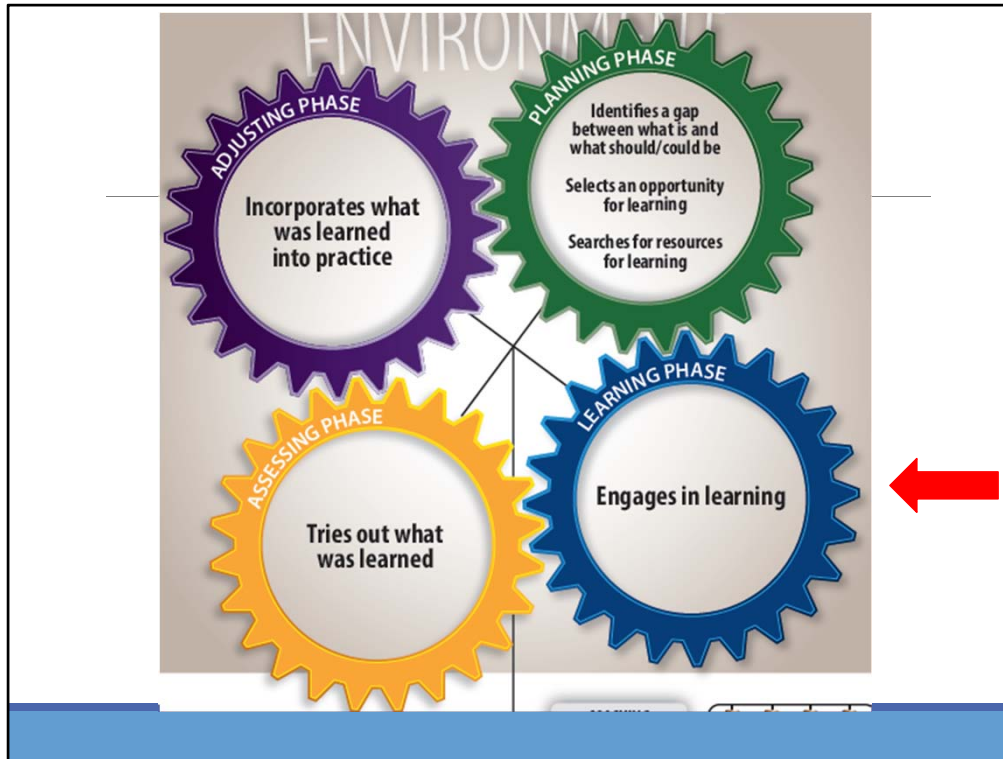
- Dr. Lerner had managed her patients with routine problems using pattern recognition , a non-analytic form of clinical reasoning that is largely automatic and unconscious.
- When she interacted with these patients with routine problems, she recognized similarities between a patient’s presentation and examples of similar presentations of previous patients (exemplars) stored in long term memory.
- Scripts of disease, exemplars of patients and encapsulated knowledge play a significant role in non-analytical reasoning making it possible to reach a diagnosis without bringing a large amount of information into consciousness for processing.
- As a result of deliberate practice and encounters with patients as she developed from novice to expert, biomedical concepts became encapsulated under clinical knowledge allowing Dr. Lerner to diagnose routine patient problems quickly and efficiently.



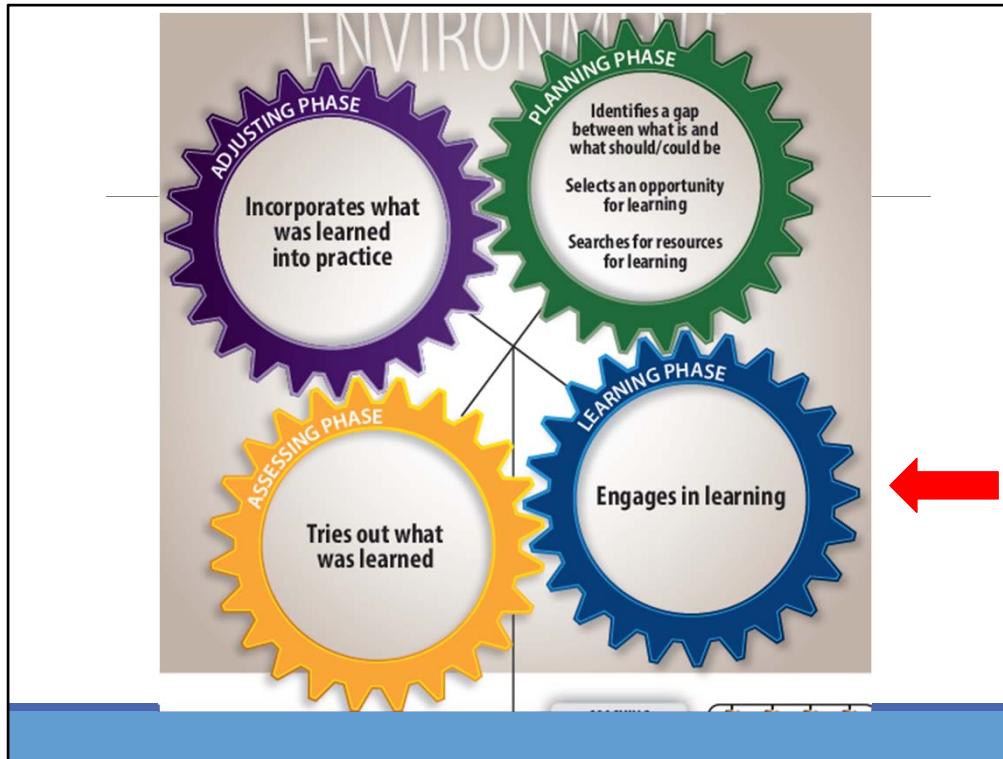
- But the cognitive dissonance she felt due to the sub-optimal results experienced by John and other patients with unexpectedly high HbA1c values caused her to shift to a more reflective approach.
- Although biomedical knowledge was not explicitly used by Dr. Lerner while diagnosing routine cases, it remained easily accessible when dealing with complicated or unfamiliar (complex) cases when non-analytical reasoning failed to produce an adequate representation of a clinical case.
- If a match did not emerge between a patient's presentation and patterns that were stored in long-term memory, she would respond to the cognitive dissonance that she felt to shift from the approach she used with routine patients to experiment with approaches with the goal of inventing an approach that will lead to more optimal outcomes for patients like John.
- She begins to innovate, setting a goal to conduct experiments on patients like John for 6 months to determine if there were a better way to manage them.



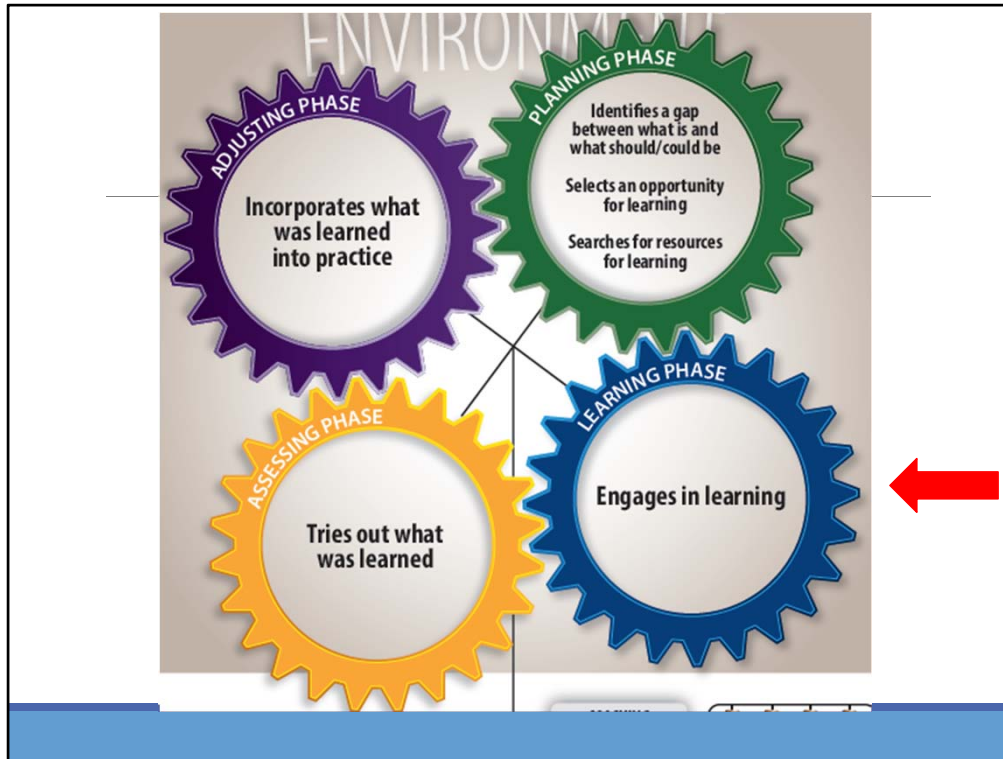
- Learning for Dr. Lerner will emerge from her experimentation with patients like John.
- Reflecting-in-practice during clinical encounters with John and patients like him, she carefully considered the signs and symptoms in the patients' presentations.
- When signs and symptoms were studied, biomedical concepts that had been encapsulated were activated.
- Information about signs and symptoms in a case point toward and activate specific, pre-existing encapsulated concepts in long-term memory.
- Relying on the biomedical knowledge that was encapsulated, she looked for similarities that may not have been obvious initially in a patient's presentation.
- She spent a considerable amount of time using activated biomedical knowledge to make sense of signs and symptoms and inventing an approach to manage complex patients like John.



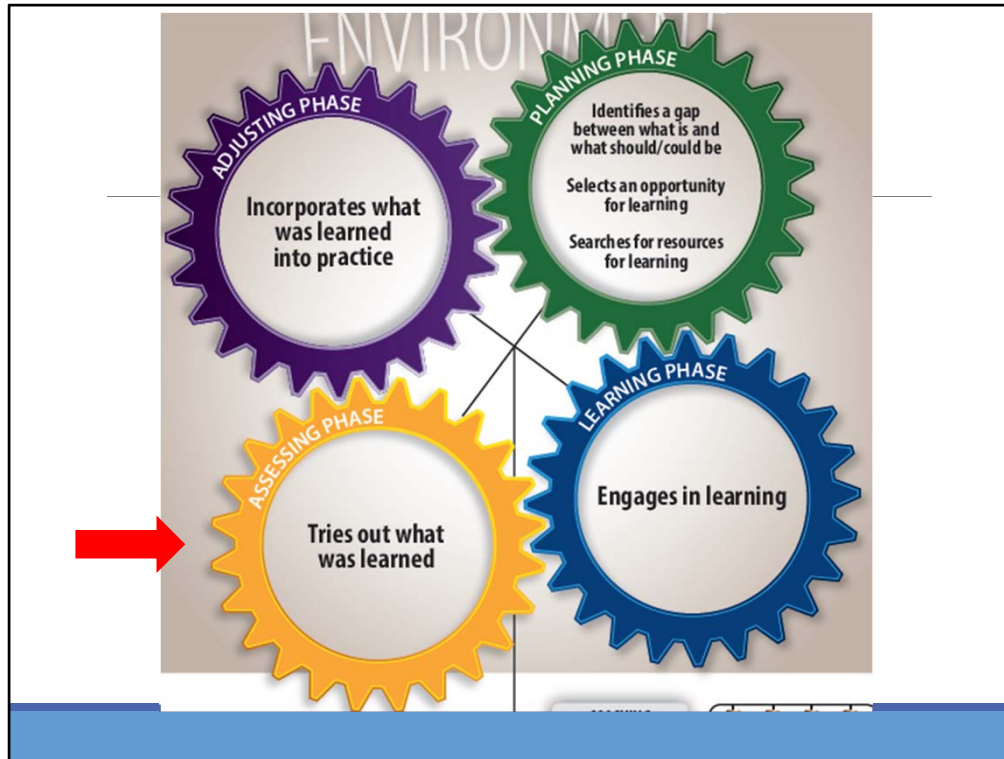
- Most clinicians learn combining informal and formal approaches.
- While Dr. Lerner was learning informally through experimentation, she continued her typical formal learning activities, but refocused her attention on what she was learning in her experiments with patients.
- She used PubMed searches to further investigate possibilities that her experimentation raised.
- She initiated conversations with endocrinologists and other colleagues in her practice and the network to solicit their ideas on her challenging patients.
- She continued to attend grand rounds and other hospital-based conferences but was more focused on attending activities that addressed some of the diabetes-related issues.



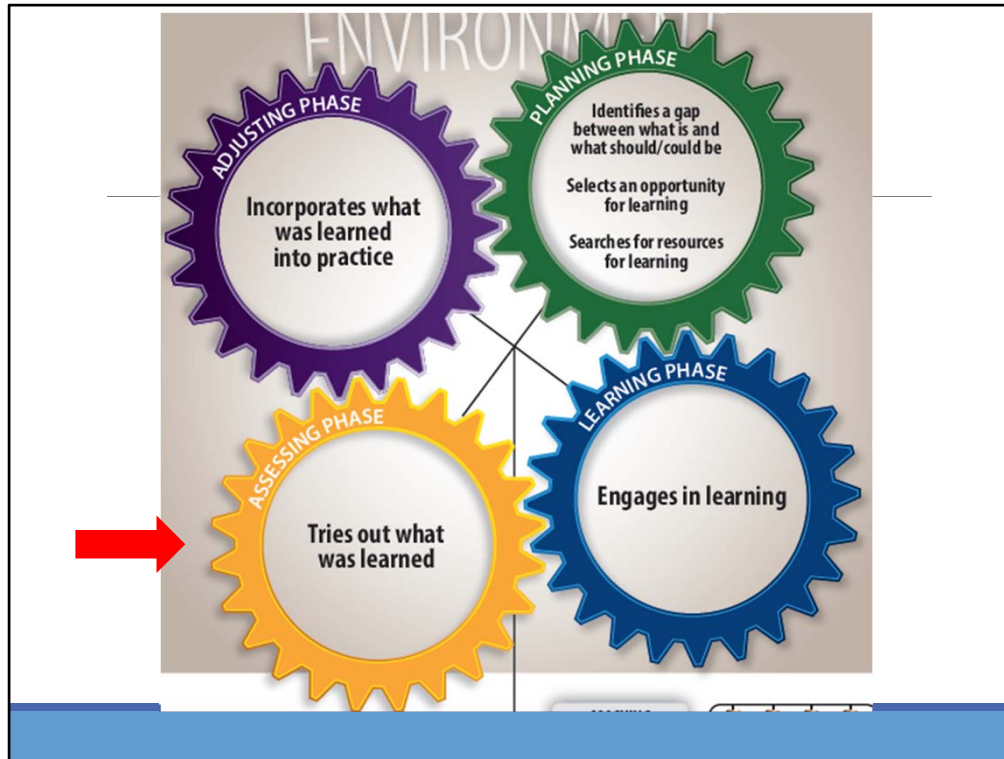
- As she continued reflecting on John and her other challenging patients, she considered the goals of care for them, glucose control and weight loss.
- She remembered that patients with untreated diabetes develop profound weight loss and wondered what the basic science mechanism was.
- Her reflections activated knowledge encapsulated around diabetes management and as she researched the diabetes basic science literature she realized that the subtype 2 sodium-glucose transport proteins (SGLT2) were responsible for most of the renal glucose reabsorption.
- She wondered about the implications for her patients.



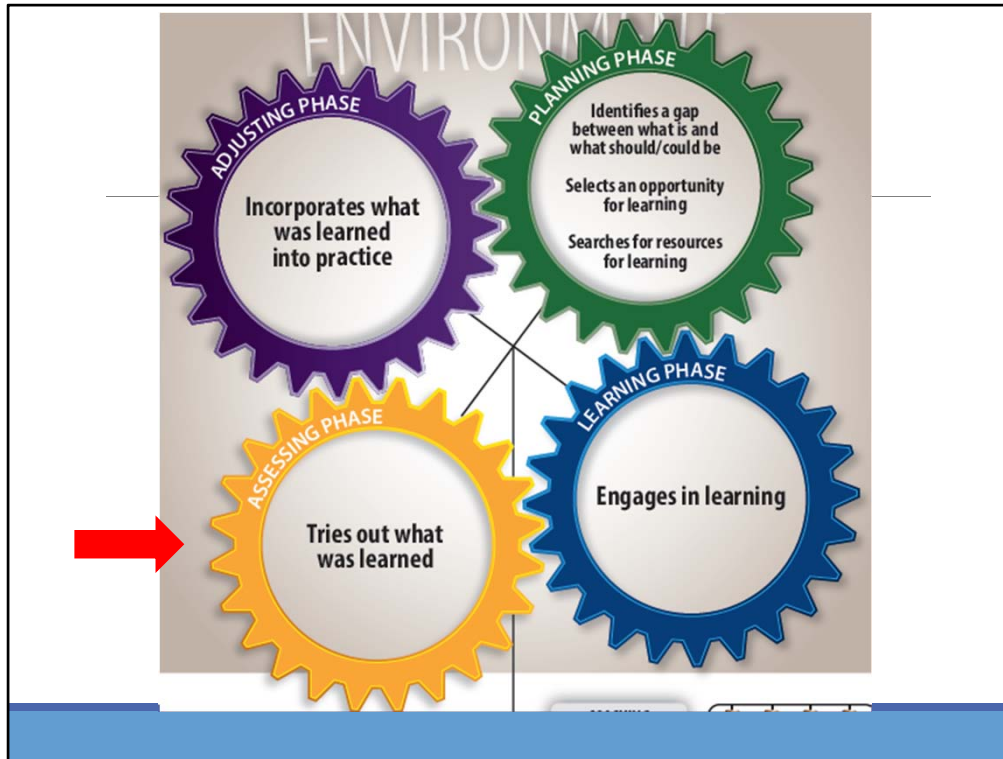
- At a grand rounds presentation, she heard about a new class of diabetes drugs, SGLT-2 inhibitors.
- These drugs lower the threshold for kidneys to excrete glucose into the urine such that whenever a patient's glucose is elevated, it is released into the urine.
- She also discussed the new drug with her colleagues and learned that this new mechanism of lowering glucose levels also causes calories to be lost into the urine and could help with weight loss.
- Because the new drug appeared to address the primary component of the goals of care for John and other similar patients, she decided to see if prescribing this new drug would work for them.
- Because of the higher cost for the new drug, she obtains prior approval from insurance companies and obtains copay discount cards to offset increased costs.



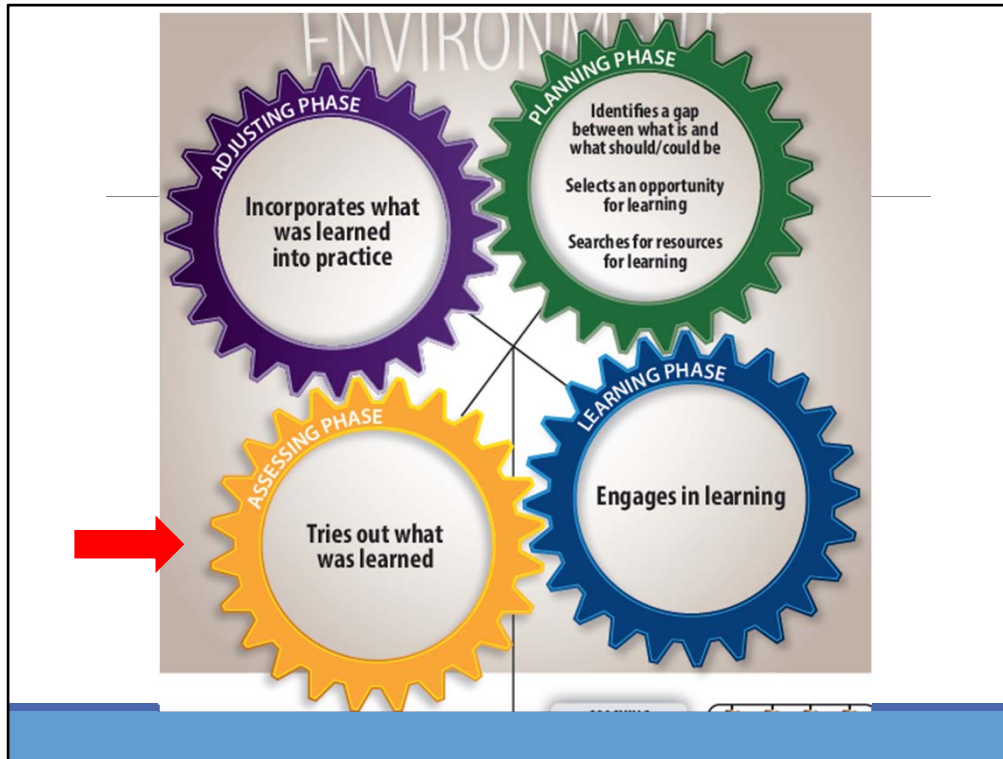
- Informed self-assessment is the central activity during the Assessing Phase and overlaps with the Learning Phase.
- Research in several fields suggests that self-assessment is not accurate. Informed self-assessment has been proposed as an alternative.
- Informed self-assessment has been described as the process that an individual uses to assess his or her performance using an external standard, externally generated data, and external feedback.
- As Dr. Lerner was conducting her experiments and was trying out what she was learning in practice, she was assessing the progress of her patients as well as her own capabilities with the new approaches.



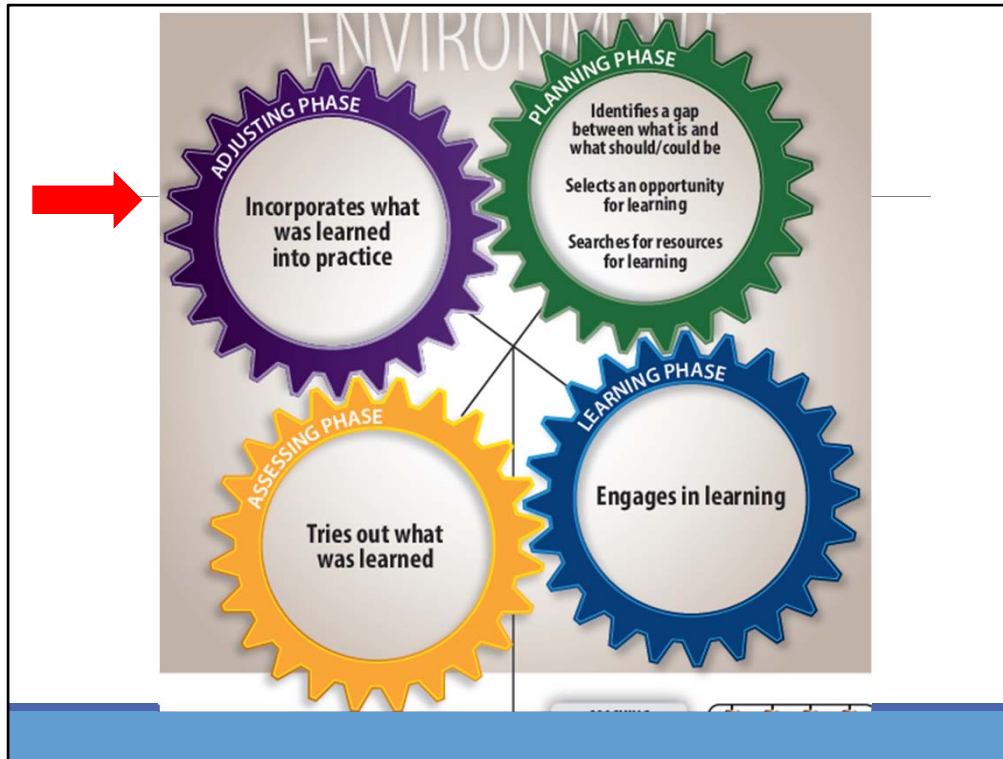
- Because she recognized the importance of an additional, objective perspective on her work, she enlisted the help of QIPS and a senior colleague.
- QIPS used data from her experiments to compare her performance against institutional standards.
- Her senior colleague served as a coach to provide “clear, timely, specific, and constructive” external feedback.
- Initially Dr. Lerner was uncomfortable with the new approach.
- Adapting is resource intensive not only in terms of time but also psychologically, requiring of the learner a certain amount of resilience.
- But, as she learned more, made changes based on what she was learning, and received feedback that was positive, she became more confident and comfortable.



- After six months of informal learning experimenting with patients and participating in formal learning activities and consulting with colleagues, Dr. Lerner felt increasingly confident that while combining metformin and sulfonylurea were an acceptable approach for most patients with T2D, incorporating a relatively new class of drugs into the regiment for John and patients like him was appropriate.
- She decided that it was important to get the approval of her colleagues and submitted the approach for review at a session of the Endocrinology Patient Care Conference (EPCC) at her hospital.
- She attended EPCC regularly and recalled that the community of practicing physicians who attend have helped other colleagues with their challenging cases.



- She reported that after several months she was pleased to see improved glucose control and weight loss in John and other obese patients with T2D.
- She explained the experiments she conducted with her challenging patients and how she used biomedical information to create a new approach to diagnose and manage them.
- She provided data that showed modest but sustained improvement in HbA1c values.
- After a short discussion, her colleagues at the EPCC agreed that the new approach could be incorporated into routine practice.
- Although the new approach did not strictly follow the ADA treatment algorithms, it was effective and was developed through a local consensus best practice process.

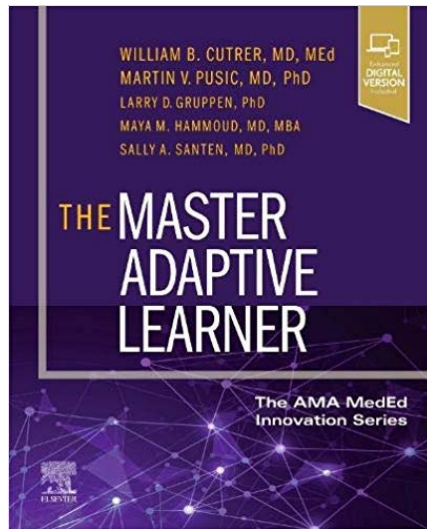


- During this final phase, Dr. Lerner integrated the new approach that she learned into her daily routines and it became a part of what she did during clinical encounters with her obese patients who have T2D. Adjustments were made in three areas:
 - Clinical encounter (micro-system). Nurses and practice staff were trained for the new approach; changes were made to the electronic health record.
 - Patient care support services (meso-system). The lab was notified that new tests were required; physical therapy and nutrition were notified of a potential increase in consultations.
 - Healthcare system (macro-system). Social services was notified that increased outreach was required to insure patients had access to nutritious food and exercise facilities.

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.

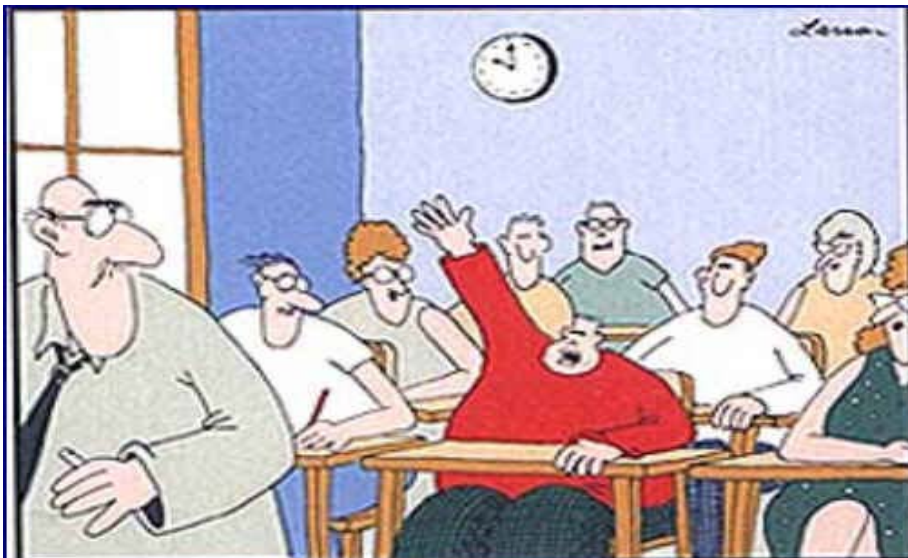
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Conclusion

- 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?

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“May I be excused? My brain is full.”