Training for Adaptive Expertise: Why, What, and How

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WHY

Background: *Routine expertise* is the efficient use of mastered skills at a high level of competency in familiar situations.

Problem: Novel case variation and continuous scientific advances preclude reliance on routine expertise alone.

Solution: Medical training programs must prepare learners to solve unfamiliar problems by cultivating *adaptive expertise*. Adaptive expertise is the ability to transfer existing knowledge to innovate a solution for an unfamiliar problem.

WHAT

Routine Practice

- Problem: Familiar
- Cognitive processes: pattern recognition, knowledge recall
- Cognitive load: Low
- Outcome: Efficient solution

Adaptive Expert

Shifts approach based on problem

Adaptive Practice

- Problem: Novel
- Cognitive processes: conceptual understanding, knowledge transfer
- Cognitive load: High
- Outcome: Innovative solution

HOW

Developmental principles of adaptive expertise and instructional strategies

Conceptual Understanding

Goal: Help learners develop a deep understanding of a concept or problem.

Rationale: Deep understanding allows for transfer of existing knowledge to novel problems.

- *Cognitive apprenticeship:* Have learners think aloud when solving problems to allow for assessment of conceptual understanding.[1]
- *Elaborative interrogation:* Ask learners "how" and "why" questions to facilitate connections between new concepts and their existing knowledge.[2]
- *Integrative teaching:* Strive to show learners how new concepts or variations in case presentations relate to their existing knowledge.[2]

Meaningful Variation

Goal: Expose learners to different presentations of clinical problems.

Rationale: Case variations help learners draw connections between concepts.

- *Hypothetical questioning:* Use targeted "What if" questions ("What if the patient was immunosuppressed? Or had housing insecurity?") to create case variety around a specific clinical concept (choosing inpatient vs outpatient care).[3]
- *Simulation:* Use simulated experiences (e.g., immersive labs, "oral boards" case practice, task trainers) to expand or supplement any deficiencies in a learner's case mix.[2]

Productive Struggle and Discovery

Goal: Promote learning from challenges or errors in a psychologically safe manner.

Rationale: Productive struggle improves problem-solving skills and long-term learning.

- *Relational autonomy:* Let learners enact different patient care plans from that of the supervising physician if reasonable and well-justified.[4]
- *Guided discovery:* Allow learners to generate their own solutions to problems prior to teaching the right answer or giving corrective feedback.[3]

Self-Regulated Learning

Goal: Develop the learner's ability to use self-directed, life-long learning skills.

Rationale: These skills prepare learners for future learning throughout their career.

- *Create a "how to learn" curriculum:* Include strategies for evidence-based learning (e.g., interleaving, spaced repetition, deliberate practice) and self-regulation (e.g., knowledge gap identification, goal setting, learning efficacy assessment).[1,2]
- *Adopt a coaching mindset:* Ask nonjudgmental, guiding questions to help learners develop new insights, learning goals, and action plans.[2]

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References:

1. Lajoie SP, Gube M. Adaptive expertise in medical education: Accelerating learning trajectories by fostering self-regulated learning. Med Teach. 2018;40(8):809-812.
2. Branzetti J, Gisondi MA, Hopson LR, Regan L. Adaptive expertise: The optimal outcome of emergency medicine training. AEM Educ Train. 2022;6(2):e10731.
3. Mylopoulos M, Steenhof N, Kaushal A, Woods N. Twelve tips for designing curricula that support the development of adaptive expertise. Med Teach. 2018:40(8):850-854.
4. Schumacher DJ, Englander R, Carraccio C. Developing the master learner: Applying learning theory to the learner, the teacher, and the learning environment. Acad Med. 2013;88(11):1635-1645.

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