Applications of cognitive apprenticeship:

Where have you seen examples of these principles?

What applications of these principles do you see for your teaching?

Pearls on Educational Principles

Cognitive Apprenticeship

Pearls on Educational Principles:

- Present an influential idea in education
- Suggest examples of its use
- Give an opportunity to apply the idea to your teaching

Principles to Guide Teaching Practice in Medical Education

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Cognitive Apprenticeship

as explained by
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The idea:

Apprenticeship is pervasive in history as a learning model using observation, coaching, and practice with experts. In the process, the learner acquires the knowledge and psychomotor skills associated with a profession. Allan Collins' concept of **cognitive apprenticeship** focuses on the development of **cognitive skills** for complex professional practice. Cognitive apprenticeship differs from traditional apprenticeship in that 1) learning considerations, rather than workplace needs, drive the assignment of learner tasks and problems, and 2) teaching emphasizes the application of knowledge and skills to varied situations. The cognitive apprenticeship framework focuses on four dimensions of the learning environment:

- **Content** required for expertise such as facts, concepts, and procedures; and problem-solving, metacognitive, and learning skills.
- **Methods** for promoting expertise development (see Table 1below).
- **Sequence** of learning activities--increasing complexity and diversity, and building global conceptual maps before acquiring specific skills.
- **Sociology**, or social characteristics affecting learning, such as real-world context, practice communities, learner motivation, and cooperation among learners.

Table 1: Teaching Strategies for Promoting Expertise Development

Modeling	Let learners observe you perform activity and think out loud to explicitly demonstrate both the physical act and your thinking
Coaching	Observe learners performing the activity and provide directed guidance and feedback
Scaffolding	Provide learners with supports to encourage performance of activities at their learning edge and gradually decrease supports over time
Articulation	Ask learners to talk through activity, explain their thinking, and/or describe their rationale for approach or decision
Reflection	Encourage learners to improve performance by analyzing their performance in relation to personal goals, performance standards for their level of training, and expert performance
Exploration	Invite learners to identify and undertake new learning activities or pose and solve their own questions to promote independent learning

The examples:

Cognitive Apprenticeship in UME Near-Peer Teaching

An intern helps a student admit a patient by:

- **asking additional history questions and suggesting which parts of the PE to perform (scaffolding).**
- **prompting the student to suggest a differential diagnosis and explain their reasoning (articulation).**
- **providing feedback on the student's plan before guiding them through writing electronic orders (coaching).**
- **explaining the admission plan to the patient while the student observes (modeling).**

Cognitive Apprenticeship in GME Learning

A residency incorporates elements into a new Systems-Based Practice (SBP) curriculum:

- **residents complete yearly QI projects in their continuity clinics to address the challenges they face in caring for patients (sociology: real-world context).**
- **interns are limited to projects solvable through interventions aimed at one microsystem (sequence: low complexity first).**
- **residents learn PDSA model and project management (content: SBP and problem-solving).**
- **faculty learn project guidance and feedback skills (method: coaching).**

References:
Collins A. Cognitive apprenticeship. In: Sawyer RK editor. The Cambridge Handbook of the Learning Sciences. Cambridge UK: Cambridge University Press; 2005. p.47-60.

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