

PRINCIPLES FOR DESIGNING COGNITIVE APPRENTICESHIP ENVIRONMENTS

[Collins, Brown, & Holum, 1991](#)

CONTENT: The types of knowledge required for expertise

- **Domain knowledge** subject matter specific concepts, facts, and procedures
- **Heuristic strategies** generally applicable techniques for accomplishing tasks
- **Control strategies** general approaches for directing one's solution process
- **Learning strategies** knowledge about how to learn new concepts, facts, and procedures

METHOD: Specific practices that promote the development of expertise

- **(Metacognitive) Modeling** teacher performs a task and “thinks out loud” so students can observe the cognitive and metacognitive processes in action
- **Coaching** teacher observes, facilitates, and provides feedback while students perform a task
- **Scaffolding** teacher provides structured supports, while prompting metacognition, to help the student perform a task
- **Articulation** teacher encourages students to verbalize their knowledge and thinking
- **Reflection** teacher enables students to reflect on their learning process, as well as use quality criteria to compare their performance to others
- **Exploration** teacher invites students to pose and solve their own problems through inquiry

SEQUENCING: Strategies for ordering learning activities

- **Global before local** skills focus on conceptualizing the whole task before executing the parts
- **Increasing complexity** meaningful tasks gradually increasing in difficulty
- **Increasing diversity** practice in a variety of situations to emphasize broad application

SOCIOLOGY: Attending to the social characteristics of learning environments

Students have the opportunity to experience:

- **Situated learning:** learning new skills and knowledge while working on realistic tasks
- **Community of practice:** common projects and shared experiences that foster ownership
- **Intrinsic motivation:** setting personal, interest-driven goals to seek skills and solutions
- **Cooperation:** working together in a way that fosters collaborative problem-solving

COGNITIVE APPRENTICESHIP METHODS

Ways to promote the development of expertise

METHODS

PROMPTS FOR REFLECTING ON PRACTICE

Modeling teacher performs a task so students can observe

[Metacognitive Modeling Planning Template >>](#)

When teaching a skill or strategy, do I describe the skill or strategy, or do I model its use in action?

When I model, do I show the process using an example, or do I fully explicate the process by “*thinking out loud*” as I work the example?

Coaching teacher observes and facilitates while students perform a task

Are performance criteria (e.g., learning targets, continuum performance indicators) shared with students upfront in an accessible medium, and referred back to regularly?

Do learners have the chance to practice new skills or strategies and get timely feedback or additional support? Are opportunities to practice new skills or strategies increasingly complex and/or diverse?

What kinds of questions do I tend to ask when providing real-time feedback or support?

Scaffolding teacher provides supports to help the student perform a task

How do I decide which parts of the task I should complete for students (who aren’t yet ready), and which parts of the task students should complete independently or with guidance?

How often do I prompt metacognition when using tools, graphic organizers, sentence starters, or other prompts to help build students’ awareness of how to decide which tools to use and when?

Articulation teacher encourages students to verbalize their knowledge and thinking

How often do students get the chance to share their knowledge, reasoning, or problem-solving process with their peers?

How could I improve the way I structure these opportunities to build learners’ self-regulatory skills and strategies?

Reflection teacher enables students to compare their performance with others

How often do students get to analyze or critique an exemplar?

How often do students get the chance to use criteria to provide each other with feedback?

Exploration teacher invites students to pose and solve their own problems

How often do students get the chance to frame and pursue their own questions about a topic or issue?

How could I better model and scaffold the inquiry process so students will be ready to lead inquiry independently?