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Empowering Your Staff to Solve Problems: Evidence-Based Training for Strategic Thinking

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EMPOWERING YOUR STAFF TO SOLVE PROBLEMS

Evidence-Based Training for Strategic Thinking

Introductions

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Agenda

- Why teach problem solving?
- Two problem solving scenarios
- Gagné's five categories of learning
- Four tips for teaching problem solving

Why Teach Problem Solving?

- Staff, students, and volunteers increasingly performing more complex tasks
- Outsourcing and/or automation of routine work
- Retirements and loss of institutional memory

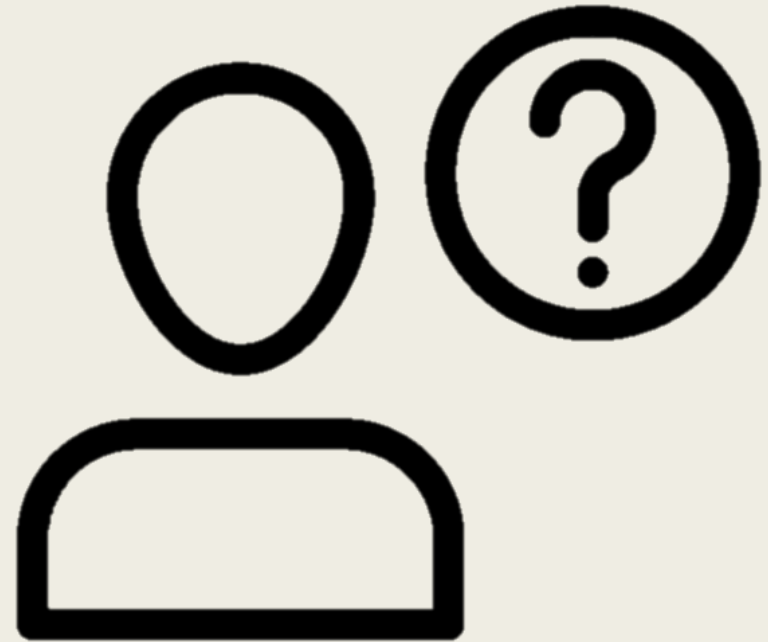
Problem Solving



- A process by which the learner
 - *discovers a combination of previously learned rules*
 - *plans their application*
 - *to achieve a solution for a novel problem situation.*



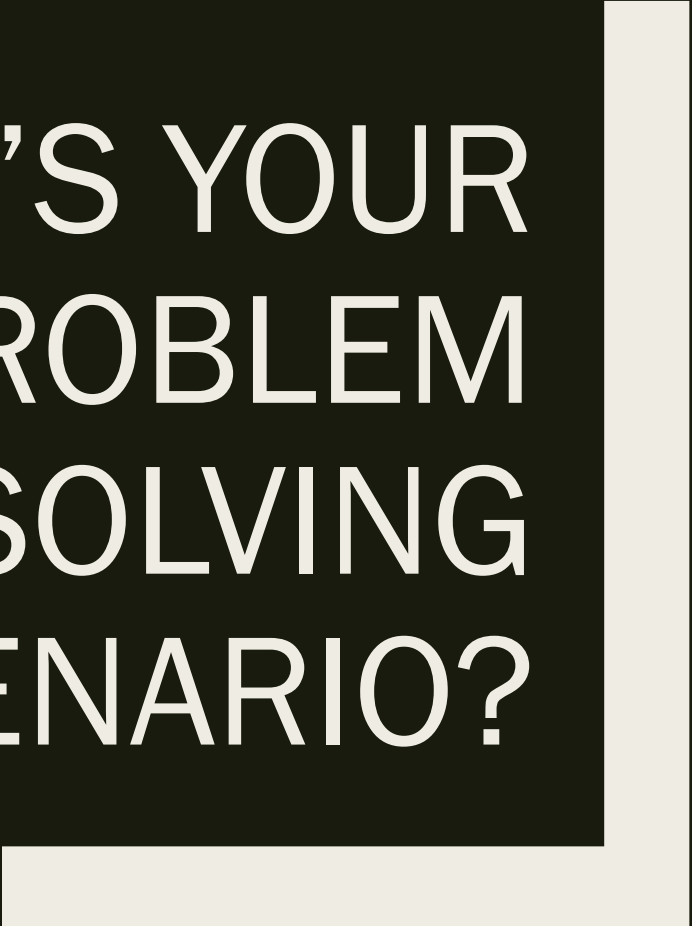
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Time's Up!



WHAT'S YOUR
PROBLEM
SOLVING
SCENARIO?

Gagné's Theory of Instruction: Five Categories of Learning



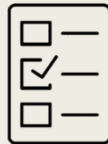
Motor Skills



Attitudes



Verbal Knowledge



Procedural Knowledge



Thinking Strategies

Different Learning Categories...



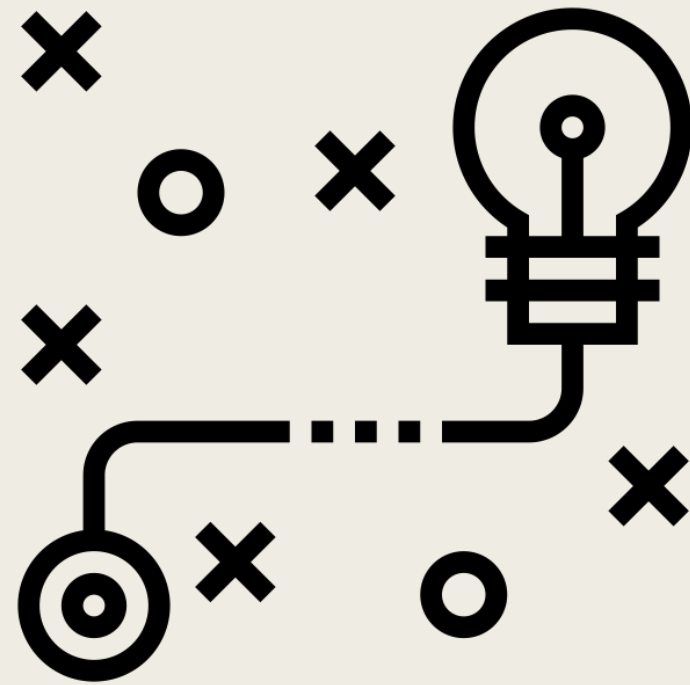
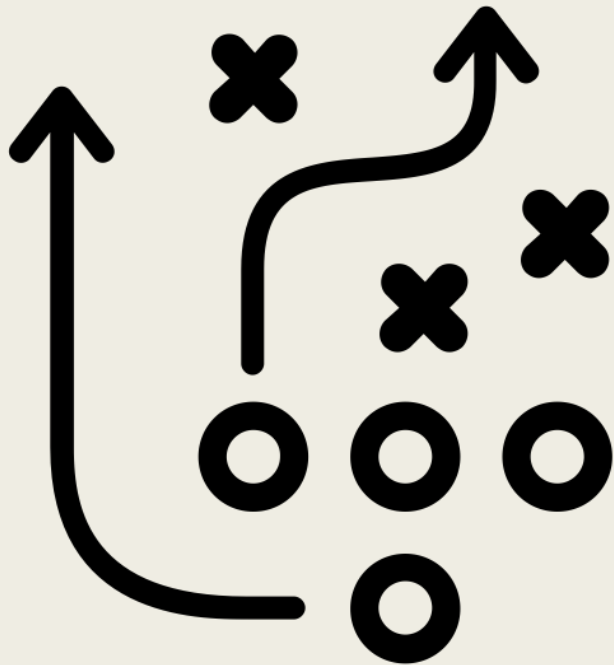
Motor Skills



Attitudes

Different Learning Categories...

...Match Different Teaching Strategies

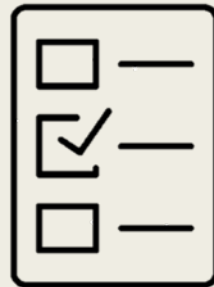


*“The performer [of problem solving] uses previously learned **rules, verbal information, and cognitive strategies** to reach a solution or achieve the goal.”*

– Robert Gagné (1996)



Verbal
Knowledge



Procedural
Knowledge



Thinking
Strategies

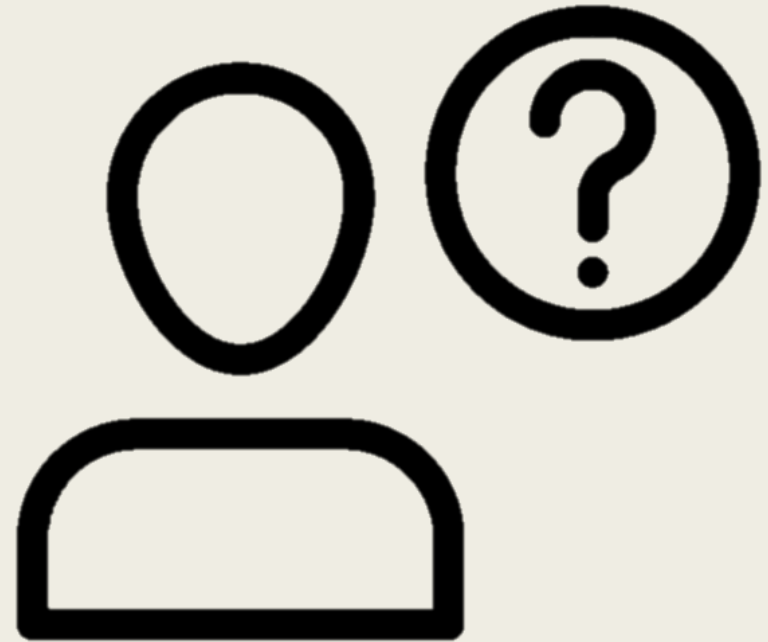
Verbal Knowledge



- Being able to state or describe something
- Examples
 - *Names or labels*
 - *Facts*
 - *Body of knowledge*



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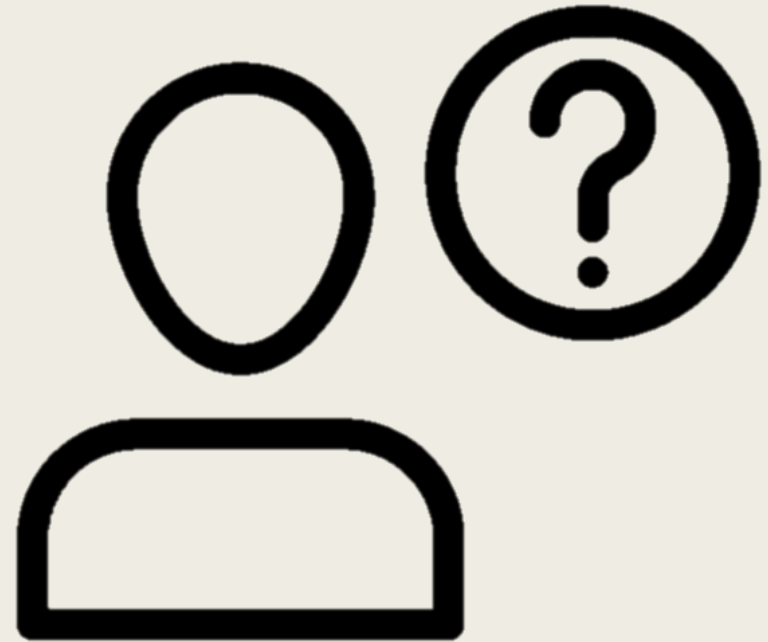
Procedural Knowledge



- Learning to distinguish between things
- Learning how to do something
- Examples
 - *Books versus bound journals*
 - *Professors and students are users*
 - *We allow professors to renew books as often as they'd like*
 - *Procedure for renewing a book*



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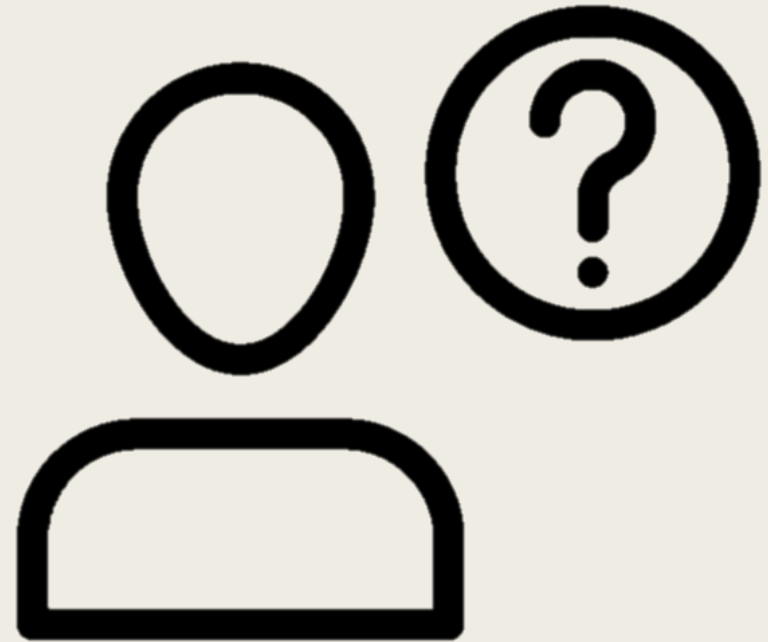
Thinking Strategies



- Ways learners manage their own thinking and learning
- Examples
 - *Highlighting*
 - *Rehearsal*
 - *Mnemonic devices*
 - *Selecting the best strategy for a particular situation*
 - *Rubber duck debugging*



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Time's Up!

SHARE YOUR
SCENARIO
AND A
LEARNING
CATEGORY



Challenges in Learning Verbal Knowledge



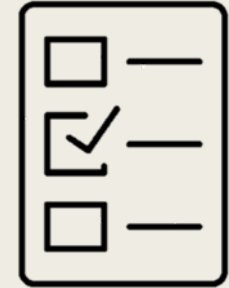
- Experts have greater body of knowledge than beginners
- Cognitive load of trying to recall relevant information (names, facts, and how those are connected in a body of knowledge)

Tip #1: Use Goal-Free Problems



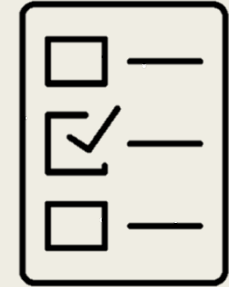
- Learner is given information and asked to discover whatever they can
- Reduces cognitive load by removing the goal and preventing working backwards

Challenges in Learning Procedural Knowledge



- Cognitive load of trying to recall concepts, rules, and procedures
- Trainer won't always be there to assist

Tip #2: Use Job Aids



■ Benefits

- *Reduces learner's cognitive load*
- *Provides concepts/rules/procedures at point of need*
- *Helps automate application of rules and procedures*
- *Creation helps trainer make implicit knowledge explicit*

■ Can include verbal and procedural knowledge

Challenges in Learning Thinking Strategies



- Many are implicit
- Take time to develop
- Different people may prefer different thinking strategies

Tip #3: Use Cognitive Apprenticeship



- Expert thinks out loud while solving a problem
- Works with both prepared and real world situations
- Also good for teaching attitudes

Challenges in Learning How to Solve Problems



- Pulls together:
 - *Recall of facts and knowledge (i.e. verbal knowledge)*
 - *Competence with applying rules and following procedures (i.e. procedural knowledge)*
 - *Ability in activating different strategies (i.e. thinking strategies)*
- Takes experience to learn how to solve problems

Tip #4: Provide Practice



- Incorporate practice in formal instruction, informal coaching, and/or on-the-job experience
- Provide practice problems that relate specifically to the job
- Provide guidance which focuses on the process



Time's Up!

WHAT'S YOUR
NEXT STEP
TO TEACH
PROBLEM
SOLVING?

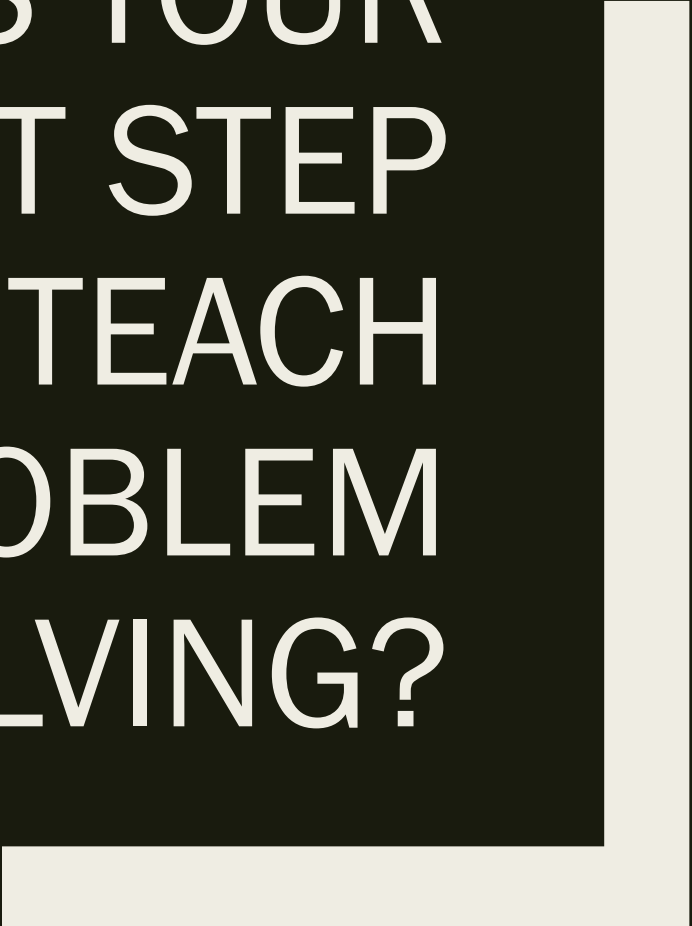


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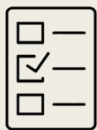
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What Questions Do You Have For Us?

■ Gagné's five categories of learning

- *Motor skills*
- *Attitudes*
- *Verbal knowledge*
- *Procedural knowledge*
- *Thinking strategies*

■ Four tips for teaching problem solving

- *Use goal-free problems*
- *Use job aids*
- *Use cognitive apprenticeship*
- *Provide practice*

Gagné's 9 Instructional Events

1. Gaining attention (reception)
2. Informing learners of the objective (expectancy)
3. Stimulating recall of prior learning (retrieval)
4. Presenting the stimulus (selective perception)
5. Providing learning guidance (semantic encoding)
6. Eliciting performance (responding)
7. Providing feedback (reinforcement)
8. Assessing performance (retrieval)
9. Enhancing retention and transfer (generalization)