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

https://tinyurl.com/ProblemSolvingVLA

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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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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

■ 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
  - Mnemonics
  - Selecting the best strategy for a particular situation
  - Rubber duck debugging
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SHARE YOUR SCENARIO AND A LEARNING CATEGORY

Time’s Up!
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
WHAT’S YOUR NEXT STEP TO TEACH PROBLEM SOLVING?

Time’s Up!
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)