How Learning Works Part I*

Prior Knowledge

Can hinder learning when:
  • Inactive
  • Insufficient
  • Inappropriate
  • Inaccurate

Methods to gauge prior knowledge
  • Talk to colleagues to get sense of student’s prior knowledge – where did they struggle?
  • Give a diagnostic quiz – include responses that reveal misconceptions
  • Have students assess their own prior knowledge
  • Hold a discussion/brainstorming session (what do you know about...what comes to mind...)
  • Look for patterns of error in student work

Methods to activate accurate prior knowledge
  • Use exercises to generate students’ prior knowledge (what do you already know about...)
  • Explicitly link new material to knowledge from previous courses and from your own course
  • Use analogies and examples that connect to students’ everyday knowledge

Methods to address insufficient prior knowledge
  • Identify prior knowledge you expect students to have
  • Remediate insufficient prerequisite knowledge

Methods to help students recognize inappropriate prior knowledge
  • Be explicit about when and how to apply prior knowledge, provide rules and guidelines
  • Identify discipline-specific conventions and when they can be applied to other disciplines

Methods to correct inaccurate prior knowledge
  • Ask student to make and test predictions, or to try to articulate and justify their reasoning
  • Provide multiple opportunities for students to use accurate knowledge
  • Recognize that deeply held misconceptions are harder to reverse

* Adapted from Susan A. Ambrose, Michael W. Bridges, Marsha C. Lovett, Michele DiPietro, and Marie K. Norman, How Learning Works: Seven Research-Based Principles for Smart Teaching (San Francisco: Jossey-Bass, 2010).
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Knowledge Organization

Experts = rich and meaningful knowledge structures
Novices = sparse and superficial knowledge structures

Strategies to reveal and enhance knowledge organization

- Create a concept map to analyze your own knowledge organization
- Analyze tasks to identify what type of knowledge organization is needed
- Provide students with the organizational structure of the course (advanced organizers)
- Explicitly share the organization of each lecture, lab, or discussion
- Explore concepts in depth, contrast and compare cases or examples, make connections among concepts explicit
- Encourage students to work with multiple organizing structures
- Ask students to draw a concept map or complete a sorting task to expose their knowledge organization – revisit over time
- Monitor students’ work for problems in their knowledge organization

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