Directly Instructing Adolescents in Metacognition Enhances Science Learning and Motivation: An In-Vivo Study
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Introduction
• Metacognition is knowledge and cognition about cognitive phenomena, including monitoring and regulation (Flavell, 1979)
• It has been positively associated with learning, academic performance, and motivation (Hacker et. al, 2000)

Hypotheses
• Explicit instruction of metacognition will:
  • Improve the accuracy of student’s metacognitive judgments
  • Increase student motivation
  • Increase student performance on scientific reasoning and transfer tasks
  • Allow students to overcome misconceptions

Methods
• Participants: 46 urban middle school 8th grade science students
• Between-subjects classroom design
• All materials were distributed as an in-class activity

Targeted Metacognitive Skills

Planning
- Definition: Understanding the problem, identifying the goal, and strategizing to create a plan
- Practice: Before starting to solve a problem, students write down how they planned to solve the problem

Monitoring
- Definition: Thinking about where one is on the path to solving the problem in order to monitor progress toward the goal
- Practice: While problem solving, they stop to check their progress, looking for any errors

Evaluation
- Definition: Comparing the answer to the problem’s goal, and looking to see which strategies worked to best evaluate the solution
- Practice: After they solved the problem, they checked their solution to make sure it made sense

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References