

Metacognition

Background Brief from the OLRC News
Summer 2004



Metacognition is essential to successful learning because it enables individuals to better manage their cognitive skills and to determine weaknesses

that can be corrected by constructing new cognitive skills. Almost anyone who can perform a skill is capable of metacognition - that is, thinking about how they perform that skill. Promoting metacognition begins with building an awareness among learners that metacognition exists, differs from cognition, and increases academic success. The next step is to teach strategies, and more importantly, to help students construct explicit knowledge about when and where to use strategies. A flexible strategy repertoire can be used next to make careful regulatory decisions that enable individuals to plan, monitor, and evaluate their learning.

Recent research indicates that metacognitively aware learners are more strategic and perform better than unaware learners, allowing individuals to plan, sequence, and monitor their learning in a way that directly improves performance. Metacognition is separate from other cognitive constraints on learning such as aptitude and domain knowledge. There is strong support for the two-component model of metacognition which includes knowledge and regulation of cognition.

Reflective aspect of learning. Knowledge about cognition corresponds to what students know about themselves, strategies, and conditions under which strategies are most useful. Declarative, procedural, and

conditional knowledge can be thought of as the building blocks of conceptual knowledge.

Control aspect of learning. Regulation of cognition corresponds to knowledge about the way students plan, implement strategies, monitor, correct comprehension errors, and evaluate their learning.

A strong correlation between these factors suggests that knowledge and regulation may work in unison to help students become self-regulated learners.

If students are taught metacognitive awareness concerning the purpose and usefulness of a strategy as they are taught the strategy, they are more likely to generalize the strategy to new situations. Given the importance of high-stakes accountability and the use of standards, it is imperative to teach metacognitive skills in the ABE classroom. The Metacognitive Awareness Inventory could be used to begin discussions in your classroom by using these guiding questions:

Think about your own metacognitive processes.
What kinds of strategies do you use to monitor and access your own learning?
Of the declarative, procedural, or conditional knowledge which are you more proficient? more inefficient?
Of planning, information management, monitoring, debugging, or evaluation strategies which are you more proficient? more inefficient?

Remember!

We engage in metacognitive activities everyday - being aware of and monitoring our learning. Although related, cognition and metacognition differ: Cognitive skills are those needed to perform a task whereas metacognitive skills are necessary to understand how it was performed. Successful adult learners employ a range of metacognitive skills, and effective teachers of adults attend to the development of these skills



Another article on Metacognition - -

Imel, S. (2002). Metacognitive Skills for Adult Learning. *Trends and Issues Alert* no. 39.
<http://www.cete.org/acve/docs/tia00107.pdf>

Metacognitive Awareness Inventory (MAI)

Check True or False as appropriate.

	True	False
1. I ask myself periodically if I am meeting my goals.		
2. I consider several alternatives to a problem before I answer.		
3. I try to use strategies that have worked in the past.		
4. I pace myself while learning in order to have enough time.		
5. I understand my intellectual strengths and weaknesses.		
6. I think about what I really need to learn before I begin a task.		
7. I know how well I did once I finish a test.		
8. I set specific goals before I begin a task.		
9. I slow down when I encounter important information.		
10. I know what kind of information is most important to learn.		
11. I ask myself if I have considered all options when solving a problem.		
12. I am good at organizing information.		
13. I consciously focus my attention on important information.		
14. I have a specific purpose for each strategy I use.		
15. I learn best when I know something about the topic.		
16. I know what the teacher expects me to learn.		
17. I am good at remembering information.		
18. I use different learning strategies depending on the situation.		
19. I ask myself if there was an easier way to do things after I finish a task.		
20. I have control over how well I learn.		
21. I periodically review to help me understand important relationships.		
22. I ask myself questions about the material before I begin.		
23. I think of several ways to solve a problem and choose the best one.		
24. I summarize what I've learned after I finish.		
25. I ask others for help when I don't understand something.		
26. I can motivate myself to learn when I need to.		
27. I am aware of what strategies I use when I study.		
28. I find myself analyzing the usefulness of strategies while I study.		
29. I use my intellectual strengths to compensate for my weaknesses.		
30. I focus on the meaning and significance of new information.		
31. I create my own examples to make information more meaningful.		
32. I am a good judge of how well I understand something.		
33. I find myself using helpful learning strategies automatically.		
34. I find myself pausing regularly to check my comprehension.		

	True	False
35. I know when each strategy I use will be most effective.		
36. I ask myself how well I accomplish my goals once I'm finished.		
37. I draw pictures or diagrams to help me understand while learning.		
38. I ask myself if I have considered all options after I solve a problem.		
39. I try to translate new information into my own words.		
40. I change strategies when I fail to understand.		
41. I use the organizational structure of the text to help me learn.		
42. I read instructions carefully before I begin a task.		
43. I ask myself if what I'm reading is related to what I already know.		
44. I reevaluate my assumptions when I get confused.		
45. I organize my time to best accomplish my goals.		
46. I learn more when I am interested in the topic.		
47. I try to break studying down into smaller steps.		
48. I focus on overall meaning rather than specifics.		
49. I ask myself questions about how well I am doing while I am learning something new.		
50. I ask myself if I learned as much as I could have once I finish a task.		
51. I stop and go back over new information that is not clear.		
52. I stop and reread when I get confused.		

Schraw, G. & Dennison, R.S. (1994). Assessing metacognitive awareness. *Contemporary Educational Psychology*, 19, 460-475.

Metacognitive Awareness Inventory (MAI) Scoring Guide

Directions – For each True on the MAI give yourself 1 point on the following charts. For each False, give yourself 0 points in the Score column. Total the score of each category and place in box.

KNOWLEDGE ABOUT COGNITION

DECLARATIVE KNOWLEDGE – The factual knowledge the learner needs before being able to process or use critical thinking related to the topic – Knowing <i>about, what, or that</i> – Knowledge of one's skills, intellectual resources, and abilities as a learner – Students can obtain knowledge through presentations, demonstrations, discussions PROCEDURAL KNOWLEDGE – The application of knowledge for the purposes of completing a procedure or process – Knowledge about <i>how</i> to implement learning procedures (e.g. strategies) – Requires students know the process as well as when to apply process in various situations – Students can obtain knowledge through discovery, cooperative learning, and problem solving CONDITIONAL KNOWLEDGE – The determination under what circumstances specific processes or skills should transfer – Knowledge about <i>when</i> and <i>why</i> to use learning procedures – Application of declarative and procedural knowledge with certain conditions presented – Students can obtain knowledge through simulation	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 80%;">DECLARATIVE KNOWLEDGE</th> <th style="width: 20%;">SCORE</th> </tr> </thead> <tbody> <tr> <td>5. I understand my intellectual strengths and weaknesses.</td> <td></td> </tr> <tr> <td>10. I know what kind of information is most important to learn.</td> <td></td> </tr> <tr> <td>12. I am good at organizing information.</td> <td></td> </tr> <tr> <td>16. I know what the teacher expects me to learn.</td> <td></td> </tr> <tr> <td>17. I am good at remembering information.</td> <td></td> </tr> <tr> <td>20. I have control over how well I learn.</td> <td></td> </tr> <tr> <td>32. I am a good judge of how well I understand something.</td> <td></td> </tr> <tr> <td>46. I learn more when I am interested in the topic.</td> <td></td> </tr> <tr> <td style="text-align: right;">TOTAL</td> <td style="text-align: center;">8</td> </tr> </tbody> </table>	DECLARATIVE KNOWLEDGE	SCORE	5. I understand my intellectual strengths and weaknesses.		10. I know what kind of information is most important to learn.		12. I am good at organizing information.		16. I know what the teacher expects me to learn.		17. I am good at remembering information.		20. I have control over how well I learn.		32. I am a good judge of how well I understand something.		46. I learn more when I am interested in the topic.		TOTAL	8						
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REGULATION OF COGNITION

PLANNING -Planning, goal setting, and allocating resources <i>prior</i> to learning INFORMATION MANAGEMENT STRATEGIES -Skills and strategy sequences used to process information more efficiently (e.g., organizing, elaborating, summarizing, selective focusing) COMPREHENSION MONITORING -Assessment of one's learning or strategy use DEBUGGING STRATEGIES -Strategies used to correct comprehension and performance errors EVALUATION -Analysis of performance and strategy effectiveness after a learning episode		PLANNING		SCORE	
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		42. I read instructions carefully before I begin a task.			
45. I organize my time to best accomplish my goals.					
		TOTAL		7	
INFORMATION MANAGEMENT STRATEGIES		SCORE	COMPREHENSION MONITORING		SCORE
9. I slow down when I encounter important information.			1. I ask myself periodically if I am meeting my goals.		
13. I consciously focus my attention on important information.			2. I consider several alternatives to a problem before I answer.		
30. I focus on the meaning and significance of new information.			11. I ask myself if I have considered all options when solving a problem.		
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TOTAL		10	TOTAL		7
DEBUGGING STRATEGIES		SCORE	EVALUATION		SCORE
25. I ask others for help when I don't understand something.			7. I know how well I did once I finish a test.		
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