

# Metacognition



**THINKING ABOUT THINKING**



# What is Metacognition?



- **Definition:** The knowledge of one's own thinking processes and strategies, and the ability to consciously reflect and act on the knowledge of cognition to modify those processes and strategies



SERC: The Science Education Resource  
Center at Carlton College  
<http://serc.carleton.edu/introgeo/assessment/glossary.html>

# Influences on Learning

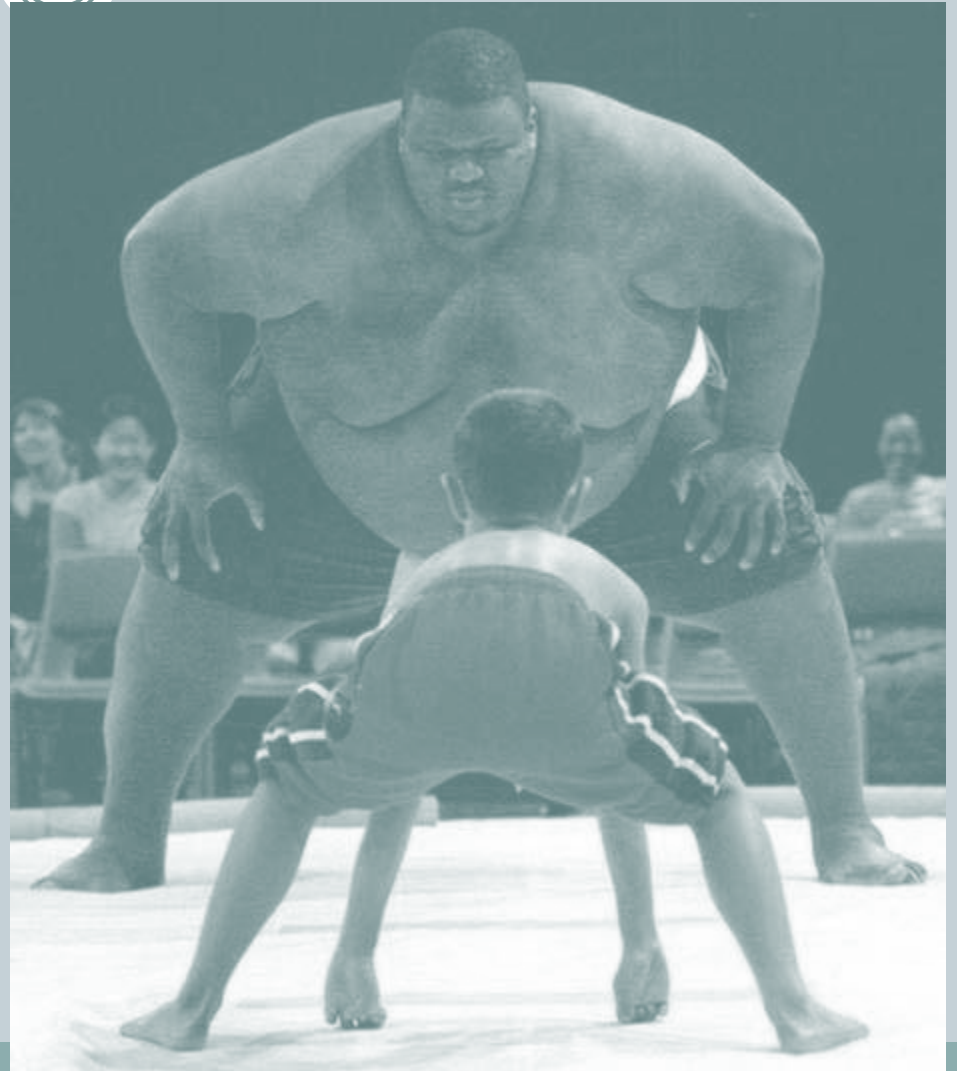


- Ability
- Prior Knowledge
- Motivation
- Metacognitive Skills



# What Difference Do Metacognitive Skills Make?

## An Analogy



# Research



- Research has demonstrated that, despite equal intelligence of subjects, variations in metacognitive skills lead to greater or lesser success in learning.



Add reference from  
pg 185

# Five Meta-Cognitive Skills



- **Planning**
- **Selecting**
- **Connecting**
- **Tuning**
- **Monitoring**



# Planning



- **Good Habits**

- Reason out what must be done
- Create a plan to accomplish the learning
- Organize time and resources appropriately

- **Poor Habits**

- Randomly try various approaches
- Do whatever comes to mind and muddle through
- Apply what has been used before, whether or not it worked or fits the new challenge

# Selecting



- **Good Habits**

- Look, listen, analyze, and sift through the chaos to identify critical and focal elements of new material
- Separates the wheat from the chaff

- **Poor Habits**

- Believe everything is important and must be learned
- Get overwhelmed by the flood of new information and drown in the details
- Make inappropriate or trivial selections



# Connecting



- **Good Habits**

- Continuously seek to build linkages with prior knowledge
- Attempt to understand new content and link it with what is already known
- Create personally meaningful analogies and mnemonics

- **Poor Habits**

- Attempt to memorize content without linkages to known skills and knowledge
- Isolate new learning from previous experience without making connections to what has been mastered previously
- Create erroneous or false analogies

# Tuning



- **Good Habits**

- As new information is received and worked with, bring the new knowledge into sharper and clearer focus
- Adjust analogies and mental images to coincide more accurately with new learning
- Discard early helpful learning crutches that are no longer required

- **Poor Habits**

- Add more information rather than test, adjust, and eliminate when having a fuzzy understanding of new material
- Apply new learning in a over-generalized manner

# Monitoring



- **Good Habits**

- Replace unproductive or insufficient strategies with more-likely-to-be-successful ones
- Make adaptations to mental models
- Constantly verify understanding and application and adjust accordingly

- **Poor Habits**

- Use known strategies whether they work or not
- Apply more effort rather than take a different learning tack
- Apply new learning in rigid fashion, forcing what has been learned to fit each case

# Activity



Planning



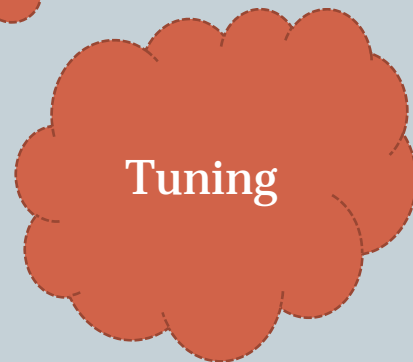
Monitoring



Selecting



Connecting



Tuning

# What Next?



## Metacognitive skills develop over time

- **What is your strongest metacognitive skill?**
- **Which metacognitive skill would you like to develop?**
- **What will you do to develop that skill?**