Metacognition and Adult Learning in a Virtual Environment

This is a 1 hour WIMBA presentation covering the topic of Metacognition, which is the ability to plan, control and evaluate control one’s own thoughts and behavior in learning new tasks and duties. Metacognition is a term that refers to the ways people think, and how they organize the information they're given. It is basically, thinking about our own thinking.

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NOTE: I read this somewhere. I do not know the origins of the text. Try to read it.

The phenomenal power of the human mind

I cdnuolt blveiee taht I cluod aulaclty uesdnatnrdf waht I was rdanieg
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Agenda

• How I became interested in this subject
• A brief history of the concept
• A description of the principles of metacognition
• Comparing and contrasting metacognition with related terms such as critical and creative thinking, associative learning and memory, introspection, and wisdom.
• How these principles may be applied to adult learning in a virtual teaching and learning environment
Why Metacognition?

• Taking Howard Gruber’s courses in Cognition at Rutgers sparked an interest in creative thinking.
• From here, I found an interest in related ideas, such as andragogy; the ways adults learn and remember.
• This culminated in a doctoral dissertation on the historical and contemporary conceptions of wisdom.
• As a member of the Distance Learning Community, and through online discussions with students, became interested in critical thinking.
• Began researching the topic of this discussion - metacognition.
Use Your Brain!

- New research into the capacity for learning and creative development in the second half of life has shown that when the mind is challenged, the brain biologically responds in positive ways, regardless of age.

[Image: The Evolution-Designed Brain]

[go here](#) for a brief introduction to the “super brain”.

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Adult Cognition and Age

- Research details a number of ways in which the brain actually improves with age. And what's even more interesting is that many of these advanced abilities correlate with key conceptual elements of innovation and creativity (CNN, 2012).
- An aging brain can better tease out patterns and see the big picture.
- The mechanics of intelligence, for example, memory and fluid intelligence, quite often show normative (universal) declines in functioning beginning in middle adulthood. On the other hand, intellectual abilities that primarily reflect the culture-based pragmatics of intelligence, such as professional knowledge and wisdom, may show stability or even increases into late adulthood (Baltes, 1987).
No problem
can be solved from the same consciousness that created it.

Everything has changed
but our thinking.

Albert Einstein
What is Metacognition?

• *Metacognition is the act of thinking about thinking.* Sometimes referred to as ‘reflective practice’; the ability to control one’s own thoughts (Merriam, 1994). It is the monitoring and self-regulation of one’s internal thought processes; an executive-level function that aims to assess one’s progress, and the achievement of goals.
Self-Regulation

- At the center of metacognitive ability is self-regulation, or the process in which a person actively searches for relationships and patterns to resolve contradictions or bring coherence out of a set of experiences.
- Contradictions lead to disequilibrium, accommodation, and assimilation, or, what Riegel (1973) calls “dialectical thinking”.
- Self-regulation begins with exploration, and progresses through invention and application.
- The work of self-regulation calls for learners to identify patterns, draw inferences, and make comparisons.
What is Critical Thinking?

• Critical Thinking involves probing for the truth from what one reads (close reading) or is told; it is the asking of provocative questions; questioning another’s position on matters, or motives along with his/her words; thinking about underlying causes.
• Skills include higher-order cognitive operations involved in processing information, rather than simply absorbing it: interpreting, generalizing, abstracting, applying, comparing, and recognizing logical fallacies.
• Issues frequently appear black-and-white, when in fact they usually consist of grays.
• In short, since it is so easy to misperceive reality, a critical thinker is disinclined to take things at face value. Skeptics!
What is Introspection?

- Began with Aristotle’s study of thinking and mental life
- Originally used by a trained professional to examine conscious experience and to measure perception and internal states.
- Newell & Simon (1972) used a form of introspection to develop ‘talk aloud’ models of human problem solving (protocols).
- Malcolm Knowles finds that adults differ from children in that they are self-directed learners, who can apply their “growing reservoir of experience” to new learning.
- John H. Flavell coins the term, *meta-memory*. Examples of metacognitive knowledge include knowledge of how learning works, and how to improve learning.
- Ann Brown (1978) states that what is a major interest is knowledge about one’s cognitions rather than the cognitions themselves.
What is Wisdom?

- Wisdom, traditionally, has been thought of as the hallmark or province of adulthood and is oftentimes associated with aging.
- Within the last two decades interest in the subject of wisdom has increased, particularly by gerontologists and life-span psychologists interested in ways adults adapt to life in their later years.
- Intellectual functioning in older adults is different, but not inferior to those employed by younger adults. The adult’s knowledge base is rich and complex.
- Baltes writes that human beings have the capacity for change across the life-span, from birth to death, and that the loss of cognitive skill with age brings about compensatory activities which lend themselves to the onset of wisdom.
- An intelligent person solves problems; a creative person finds problems to solve; and a wise person knows when his or her problem-solving strategy needs revision.
What Is Cognition?

• Cognition is all the processes by which sensory input (sight, sound, smell, touch, taste) is transformed, reduced, elaborated, stored, recovered and used

• People are pattern-recognizing and pattern-forming beings. In order to make sense of the world, we look for repeating qualities in phenomena around us; we try to discern the reasons behind repeating events and processes. On a very simple level, we may group things by color, or shape, or texture, or number or according to qualities of sound, smell, taste, touch or properties of movement. Or we may group them according to purpose or function.

• Memory is important for distance educators since learners use their own past experiences in meeting present and future problems.
Strategies of Cognition and Memory

• Feeling of Knowing, and Tip-of-the-Tongue states: Remembering is easier when we think of the context in which it was learned, rather than considering it in isolation. For example, nonsense syllables, such as ROH, LEZ, SUW, and QOV, are hard to remember because they have no prior cognitive association. Your mind is more receptive to information about a subject or concept that you have already been exposed to.

• Here’s an example: You meet someone you worked with 7 years ago. She calls your name, but you can’t remember hers. As you drive away, you try to recall the name, but can’t. You get home, and notice an employee telephone directory you saved from when you worked with her. You pick up the directory; the name immediately comes to you. Why?
Here is a cognitive strategy for remembering a name: We see a woman, but can’t recall her name. We have had experience with that person, so we know the name is in memory. This is the Tip-Of-The-Tongue phenomena. The name begins with a letter; letters have sounds. We move through the alphabet for the first name, stopping when the sound of the letter gets our attention. We make an attempt to recall the name. Sometimes it is the sound of the letter that gets our attention. The letter C, sounding like “sea” gets our attention. We think - Celia?. No.
Strategies of Cognition and Memory

• We proceed through the alphabet. We can do this for the last name as well. The letter T seems to ring a bell. We put these two together and recall the woman’s first name – it is Tracy. The last name then falls in easily. This reflective strategy often works.

• Our ability to retrieve items from memory depends on how well we filed them away into categories. Since we learn by association, our mind contains zillions of them; some are visual, some are associated with smells, most are words and their meanings.

• I find mnemonics to be easy to develop and great for recalling things that simply need to be memorized, but not really understood. I apply this method when I need to recall dates, names, or places.
Strategies of Cognition and Memory

• A mnemonic is simply a little catch phrase, word, or image that reminds you of a list or answer. Associate the information with something that is easier to recall and leave yourself pointers to the more complicated bits of information. For me it can be one of the most powerful tools at my disposal when I need to remember something.

• For example, learning the Great Lakes is difficult to remember. If you were asked what they were, you might not remember them all. But if you create a mnemonic – HOMES, that is all you need. The letters stand for Huron, Ontario, Michigan, Erie, and Superior. Any other examples?
Strategies of Cognition and Memory

- Pay Attention – What you focus on will be retained. Avoid distraction, externally and internally.
- Migrate the data - Simply reading or scanning a piece of information does not necessarily guarantee storage in memory. It is best to take the information in, and reproduce it in a different way. Drawing a picture is one. The brain loves images. You could also say it aloud, tell it to someone, rephrase it, make a song or rhyme. When you do this you engage your brain and increase the importance of that information.
- Teach - I have always found that by teaching someone else a topic I have recently learned, I virtually guarantee it a spot in my long term memory. I have learned that by teaching others, I learn it better.
Strategies of Cognition and Memory

• Visualization – Use mind-mapping, which is a visual representation of what you are thinking. Secondly, let’s say you are trying to remember a variety of objects, like a grocery list (not as necessary since iPhones took over the world), begin by picturing an empty room in your mind and imagine yourself opening the door into this room.

• Begin visualizing the objects that you want to remember in each corner of the room. You may also place them along the walls, but each item has its own spot in the room. If this room becomes crowded, put in a door to a second room for added storage. Perhaps you can give each door a name – breakfast, lunch, and dinner.
Metacognitive Learning Strategies

To increase metacognitive abilities, learners need to possess and be aware of three kinds of content knowledge:

1. **Declarative knowledge** is the factual information that one knows; it can be declared—spoken or written. An example is knowing what a mnemonic is.

2. **Procedural knowledge** is knowledge of how to do something; for example, knowing how to develop a mnemonic that reduces the information one must remember.

3. **Conditional knowledge** is knowledge about when to use a procedure, skill, or strategy and when not to use it; why a procedure works and under what conditions; and why one procedure is better than another. For example, when learners are engaged in a case study, they decide on which of the principles learned should apply.
Talk Aloud/Think Aloud Metacognitive Strategies

**Before:** When developing a plan of action ask yourself -

- What in my prior knowledge will help me with this particular task?
- What is it about this task that I don’t know?
- Do I know where I can get more information?
- How much time do I have to learn this?
- How can my preferred learning styles be used to help me enjoy this task?
- What are some strategies and tactics that I can use to learn this?
- Did I understand what I just heard, read or saw?
- Can I explain it to someone else?
- What does spotting an error tell me about my learning?
- Is my plan/strategy working? In what areas can I revise it?
During - When you are maintaining/monitoring the plan of action, ask yourself:
• How am I doing?
• Am I on the right track?
• How should I proceed?
• What information is important to remember?
• Should I move in a different direction?
• Should I adjust the pace depending on the difficulty?
• What do I need to do if I do not understand?
• Evaluating the plan

After - When you are evaluating the plan of action ask yourself:
• How well did I do?
• Did my particular course of thinking produce more or less than I had expected?
• What could I have done differently?
• How might I apply this line of thinking to other problems?
• Do I need to go back through the task to fill in any "blanks" in my understanding?
Metacognition Strategies: Applied to reading, writing, solving math problems, or in learning online.

For Facilitators

• Teach learners how to create higher-level questions, and how to answer them.
• Require learners to list learning goals at the outset of the course.
• Request that they monitor progress through the course.
• Show learners how to use self-checking mechanisms.
• Provide learners with rubrics, and tools like the Ladder of Inference, so they know what the performance expectations are for earning higher grades.

For Learners

• Generate questions and answer them to improve comprehension.
• Read articles and summarize main points to improve understanding.
• Have a purpose in mind when reading online material or doing, for example, term papers.
• Develop daily or weekly “to do lists”.
• When planning a paper, ask themselves which topics interest them.
• When planning, ask themselves how can I best utilize my time?
Metacognition Strategies: Applied to reading, writing, solving math problems, or in learning online.

Facilitators
- Encourage and emphasize elaboration, whether in posting discussions, assignments, journaling, or essay questions.
- Provide criteria for learners to use when evaluating their own work.
- Give learners timeframes to assist them in planning.
- Encourage reflection often in the form of journaling.

Learners
- Periodically evaluate their own work.
- Pay close attention to timeframes.
- When reading online, read slowly and carefully to make sure the material is understood.
- Try to get back on track when concentration is lost.
- Pay closer attention to difficult course material.
Metacognition Strategies: Applied to reading, writing, solving math problems, or in learning online.

Facilitators

• Require learners to create examples, make analogies, and explain relationships between concepts.
• Require learners to use organizing strategies, such as concept or mind maps, network representations, and other graphic organizers.

Learners

• When reading online, decide what to read closely and what to ignore.
• When online text becomes difficult, re-read it to increase understanding.
• Check understanding when new information is introduced.
• Go back and forth in the online text to find relationships among ideas.
Metacognition Strategies: Applied to reading, writing, solving math problems, or in learning online.

Facilitators
• Build self-efficacy.
• Teach them to be honest with themselves. Do they know it or not?
• Address any misconceptions. The key to a student's ability to become a self-regulated (i.e., metacognitive) learner is understanding that one's ability to learn is a skill that develops over time rather than a fixed trait, inherited at birth. Wise behavior can be learned.
• Teach them the metacognitive and self-regulatory strategies.
• Encourage reflection and revision.
• Teach them how to reinforce their efforts.

Learners
• Print out a hard copy of the online text and then underline or circle information to help remember it.
• While in the process of writing a term paper, ask themselves how am I doing? (monitoring progress).
• Get an early start. Read ahead of the teacher.
• Study often to avoid the Forgetting Curve.
• Set goals.
Metacognition Strategies: Applied to reading, writing, solving math problems, or in learning online

Facilitators
• Have student monitor a peer's learning/thinking/behaving in a dyad.
• Have students develop questions; ask questions of themselves, about what's going on around them (Have you asked a good question today?)

Learners
• Use self-evaluation and practice quizzes often.
• Use preferred learning styles: visual, auditory, print, and kinesthetic
• Have fun with the learning
Questions and Answers
References


The aging brain: Why getting older just might be awesome, retrieved 6/19/2012, from CNN.