

Memory Unit – 2 day lesson plan

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Domain: Cognition

Standards Area: Memory

Content Standards: 1: Encoding of Memory, 2: Storage of Memory, 3: Retrieval of memory

Performance Standards:

1.1 Identify factors that influence encoding

1.2 Characterize the difference between shallow (surface) and deep (elaborate) processing

1.3 Discuss strategies for improving the encoding of memory

2.1 Describe the differences between working memory and long-term memory

2.3 Discuss types of memory (and memory disorders - second portion of this performance standard met on the third day not included in this 2-day plan)

2.4 Discuss strategies for improving the storage of memories

3.1 Analyze the importance of retrieval cues in memory

3.2 Explain the role that interference plays in retrieval

3.5 Discuss strategies for improving the retrieval of memories

Part One: Structure and Substance of Memory

Students will have read the section of the chapter on structure of memory, focusing on the 3-box model. To review and clarify the model, students will be organized into groups of 5. Each group receives three boxes with a slit cut halfway down opposite sides (square tissue boxes are the best), three pieces of rope/string/yarn that have a knot on each end, 3x5 cards, markers, and the three-box model worksheet.

The students are instructed to use these objects to create the three-box model of memory (which they read about prior to class). The 3x5 cards are bent in half and used to label each part: sensory, working, and long-term memory for the boxes; attention, encoding, and retrieval (with arrows) for the ropes (the folded 3x5 card will hang over the rope). Students then compare their work and make any corrections necessary. Next, the students

are asked to describe the qualities of the three boxes, including capacity, length of time, and purpose of each and write these on the card labels.

Students document their models by creating a diagram on their accompanying worksheet. Then ask students if they think that this model accurately represents memory. What other possibilities are there? How is this issue similar to the stage v. continuity debate in development theory? Some issues that arise might include: there may not be three distinct memory systems, long-term memory might be multiple types or a continuum, our brains may not operate like a computer/sequentially, does not allow for the possibility for a parallel processing model/networks, etc. Have students relate deep v. shallow processing to the model as well as examples.

Part Two: How do we remember?

Introductory Activity: The Meaning of Doodles

<http://www.exploratorium.edu/exhibits/doodles/index.html>

Students have a blank paper and pencil. Teacher displays the first page of “The Meaning of Doodles” on the projector. Students are given one minute to memorize the four boxes of simple images and then recreate them in a mixed order on their blank sheet as indicated on the second step/slide of the website. Then click on the next image and repeat the process. After students have finished attempting the second drawing recall ask, “Tell me how you felt about these two tasks?” Most will share that the second set were easier to recall because the labels for each image gave meaning, resulting in the creation of an entire concept out of the visual element. Discuss how meaning relates to memory. Ask for an example or two of how adding meaning to material from school has made it more memorable. Share the terms shallow (surface) and deep (elaborative) processing to label the effect witnessed.

Focused activity: Following the Deese–Roediger–McDermott paradigm of “lures” in a word recall task, I modified this research to create a memory activity that focuses on the concept of school, but does not include the word “school” in the list, but rather “desk”, “pencil”, “teacher”, etc.. Students are told that they will take a memory test, but cannot write anything down. They are shown a PowerPoint presentation of these words, three seconds per word, with an image of a classroom at the end of the list that they study for 20 seconds. Then they are told to write down all the words from the list that they can remember. Next, with clickers, students respond to

questions such as, did you see the word “school”? “worksheet”? “study”? etc. Teachers may want to vary the order, with the recognition task first and the recall task second for some sections and compare the results.

Students are then given a worksheet to document the different aspects of memory and give labels to what they have observed in their memory processes. The following terms/concepts are discovered in this bottom-up activity: recall, recognition; semantic, visual, acoustic encoding; serial position, primacy, and recency effects; mnemonics; and interference. Please see the worksheet for more specifics on how these are addressed.

Included in this list I have made a visual change - different font/color for one word “worksheet”, a semantic change of one proper noun, a specific person (a 6’6” security guard who knows almost all the students’ names) that all the students know from their campus, “Walt”, three words in a row that start with the same letter, etc. The PowerPoint is included in the documents to explore/modify to make the proper noun specific to the campus where it is used. A principal’s name or the teacher’s name may be substituted.

This lesson also attempts to have students consider why and how of memory, not just rote learning of terms. Discussions may result as you move through the questions on the worksheet into more specifics. I usually allow time for this so that depth of knowledge may be gained as students direct the conversation. Other topics that may be raised could be the biology of memory and long-term potentiation, ADHD/dyslexia effects on working memory, discussion of decay versus retrieval issues with age, and so on.

Further lessons in this unit continue to explore methods to improve encoding, storage, and retrieval, especially as it relates to practical methods for college. The processes of forgetting, types of interference, memory construction/modification, memory disorders, etc. would be explored in more depth as well. Depending on your time frame, the short doodles activity could be placed at the end of day one or the beginning of day two.

Memory for Words Activity

1. List all the words that you remember from the PowerPoint here.
2. What term is used for the type of retrieval used in question one? (recall)
3. Did you make any errors with the questions, “Did you see the word ...”? What term describes this type of remembering? (recognition)
4. Why would someone think that “school” was a word that they saw? What type of encoding is probably at work here? (semantic)
5. Why do you think “worksheet” was remembered by most? (iconic memory, visual encoding – color, font differences)
6. Why do you think “Walt” was remembered by most? (only word that had a specific image rather than a prototype/general image)
7. What type of encoding was probably used to remember the three words in a row that started with “p”? acoustic encoding
8. Compare the words that you remembered and their order. What do you notice?
9. When the order affects memory, it is called _____ effect. (serial position)
10. When the first items are remembered best, the _____ effect is evident. (primacy)
11. When the last items are remembered best, the _____ effect is evident. (recency)
12. Which serial position effect would probably still be seen a week from now? Why? (primacy; recency effect is probably due to no interference to push out of working memory rather than long-term memory storage, so it won't last a week)
13. Did you use any methods/mnemonics to help you remember the words (circle): method of loci, acronyms, rhymes, chunking, imagery, story (possibly connected to an episodic memory) or something else? Did it work well? Do you think they helped keep the words in working memory or were they stored in long term memory?
14. Did the picture shown for 20 seconds at the end of the list impact your recall of the words? Did it help or serve as interference? Explain.
15. What other factors might have affected your performance on this memory task? (attention, motivation, biological brain differences, alertness, emotional state, use of mnemonics) What theory from the sensation/perception unit overlaps here? Signal Detection Theory What part of the box model might this theory apply? (between sensory memory and working memory)

Three-Box Model of Memory

Draw a representation of your group's model, including arrows for the ropes, here:

Inside each box, include the time frame, capacity, and purpose of each category.

Where does maintenance rehearsal belong in this model? Why? Is it a shallow or deep processing? Add it above.

Give an example of how shallow processing/maintenance rehearsal might be useful.

Give a second example of when deep processing/elaborative rehearsal would be beneficial. Where in the three-box model would this probably fit?

What are some possible weaknesses to this model?