Writing Multiple-Choice Questions to Assess Higher Order Thinking

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Session Outcomes

By the end of this session, you will be able to:

✓ *Define* higher order (HO) thinking

✓ *Explain* the Revised Bloom's Taxonomy of Educational Objectives

✓ *Outline* guidelines to writing HO MCQ
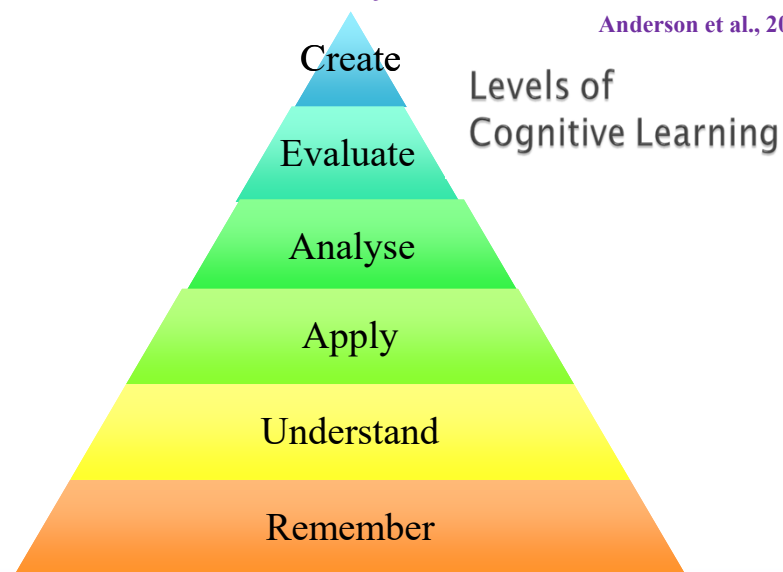
✓ *Compose* MCQ that assess HO thinking

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What is HO thinking?

✓ Thinking that goes beyond the basic recall of memorized information; that requires more cognitively complex operations such as application, analysis, evaluation, and creation (Anderson et al., 2001; Bloom et al., 1956; Krathwohl, 2002)

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Revised Bloom's Taxonomy of Educational Objectives

Anderson et al., 2001

Create

Evaluate

Analyse

Apply

Understand

Remember

Levels of Cognitive Learning

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What is a learning outcome?

✓ A learning outcome (LO) is a statement describing a competency or performance capability to be acquired and then ***demonstrated*** by the learner.

✓ It is a statement of exactly what students will know and/or be able to do when they have completed instruction.

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Example Items

✓ *LO: Identify* the artists responsible for major contemporary musical pieces.

1) What band first recorded the song "Let It Be"?

   a) The Rolling Stones
   b) The Beatles
   c) The Beach Boys
   d) The Who
   e) The Kinks

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Example Items

✓ *LO: Apply* the memory systems to real-life contexts.

2) Which one of the following memory systems does a piano-tuner mainly use in her/his occupation?

a) Echoic memory

b) Short-term memory

c) Long-term memory

d) Mono-auditory memory

e) Declarative memory   *(Carneson, Delpierre, & Masters, 2016)*

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Example Items

✓ *LO: Judge* the assertion and reason of an argument.

3) Judge the sentence in italics according to the criteria given below:

"The United States took part in the Gulf War against Iraq BECAUSE of the lack of civil liberties imposed on the Kurds by Saddam Hussein's regime."

a. The assertion and the reason are both correct, and the reason is valid.

b. The assertion and the reason are both correct, but the reason is invalid.

c. The assertion is correct but the reason is incorrect.

d. The assertion is incorrect but the reason is correct.

e. Both the assertion and the reason are incorrect.   (*Carneson et al., 2016*)

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How would you classify…

The area of the brain located in the temporal lobe and involved in speech comprehension is called

a. Broca's area
b. Wernicke's area
c. the amygdala
d. the fusiform gyrus
e. the primary auditory cortex

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Remember

How would you classify…

Let's say that you work for a drug company. You are trying to develop a new drug for the treatment of schizophrenia. Which of the following neurotransmitters are you likely to target?

a. dopamine
b. serotonin
c. GABA
d. acetylcholine
e. norepinephrine

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Apply

How would you classify…

One of your patients is suffering from depression. As you consider a drug to prescribe, you are concerned about your patient's high blood pressure and the fact that she really likes to eat cheese. Which of the following antidepressant drugs should you avoid?

a. a tricyclic
b. an SSRI
c. an MAO inhibitor
d. any drug that increases GABA
e. these should all be avoided

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How would you classify…

Neuron A and Neuron B synapse with neuron C. You are measuring the electrical activity in Neuron C. When Neuron A fires, there is a depolarization observed in Neuron C, but not enough to generate an action potential. But when Neuron A and Neuron B fire at the same time, there is an action potential generated in Neuron C. How can we explain this?

a. Neuron A depolarizes the post-synaptic membrane, but Neuron hyperpolarizes it.
b. Neuron A hyperpolarizes the post-synaptic membrane, but Neuron B depolarizes it.
c. The graded potentials from Neuron A and Neuron B sum together to reach the depolarization necessary for an action potential.
d. The synaptic connection for Neuron B is actually at the axon.
e. Measurement error on the first observation.

Western   Analyze

Other Tips…

- ✓ Provide a case, graph, or table and ask for interpretation
- ✓ Case, incomplete scenario, graph, or table may be the start for several questions
- ✓ Students need to think about HO MCQ to solve them
- ✓ Provide more time to complete than typical MCQ

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Other Tips…

- ✓ Give yourself more time to write than typical MCQ

- ✓ Ask colleagues to review

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Activity

- ✓ In pairs, take 15-20 min to develop a HO MCQ for a specific level of Bloom's

- ✓ Use Bloom's handout & test blueprint as needed

- ✓ After 20 min, pairs present items & full group will guess Bloom's levels and provide feedback on items

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Questions??

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References

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