Common Core, Difficulty & Complexity

Let’s go deeper into Webb’s Depth of Knowledge

QUESTIONS

when who ? where

what why

who who

where where

how how

how how

when when

where where

what what

? ?

? ?

? ?

? ?
Today’s Agenda

• What are the 4 levels of complexity in Webb’s Depth of Knowledge (DoK)?
• How can I apply the complexity levels to teaching, learning & assessing?
• What is the difference between difficulty & complexity?
• What does the brain research that underpins these concepts say?
• How does Webb’s DoK relate to the Common Core Standards?
Lesson on Literary Devices

1. What is a literary device?

2. Why do writers use literary devices?

3. Did Dr. King use any literary devices in his speech?
Martin Luther King Jr.
Jan. 15, 1929 - April 4, 1968

“I have a dream that one day this nation will rise up and live out the true meaning of its creed: "We hold these truths to be self-evident, that all men are created equal."
What do you think?

Let’s take a poll

Which level of thinking did I require of my students based on the questions I asked them about Dr. King’s speech?

1. Low Level
2. Medium Level
3. High Level
Lesson on Literary Devices

1. Describe 2 characteristics of a simile.  
   *(DoK 1 – requires simple recall.)*

2. Describe the difference between a simile and a metaphor.  
   *(DoK 2 – requires cognitive processing to determine the differences between the 2 devices.)*

3. Describe how the use of literary devices adds richness to the speech.  
   *(DoK 3 – requires deeper understanding of literary devices and a determination of how best to express it.)*
• Depth of Knowledge
  – DoK
  – A model for cognitive complexity
DoK is not a verb... nor is it Bloom’s Taxonomy in a circle!
Norman Webb’s Contribution…

• Webb developed a process and criteria for systematically analyzing the alignment between standards and assessments.

• Webb’s Depth of Knowledge Model can be used to analyze the cognitive complexity required for the student to master a standard or complete an assessment task.
Cognitive complexity refers to the cognitive demand associated with a test item. The difficulty of the item is not related to the cognitive complexity of the item.

The Depth of Knowledge level of the item is determined by the complexity of the mental processing that the student must use to answer the item.
What does Webb’s DoK measure?

“DoK measures the degree to which the knowledge elicited from students on assessments and performance indicators or through questioning is as complex as what students are expected to know and do as stated in the state standards.”

~Norman Webb
Why Depth of Knowledge?
How does DoK work?
Levels Low=1, Medium=2, High=3/4
Webb’s Four Levels of Complexity

**Level 1 - Recall** - Recall of a fact, information, or procedure

**Level 2 - Basic Application** - of Skill/Concept - Use of information, conceptual knowledge, procedures, two or more steps, etc.

**Level 3 - Strategic Thinking** - Requires reasoning, developing a plan or sequence of steps; has some complexity; more than one possible answer; generally takes less than 10 minutes to do.

**Level 4 - Extended Thinking** - Requires an investigation; time to think and process multiple conditions of the problem or task; and more than 10 minutes to do non-routine manipulations.
Same Verb: 3 Different Levels of Complexity

DoK 1- **Describe** three characteristics of metamorphic rocks. *(Requires simple recall)*

DoK 2- **Describe** the difference between metamorphic and igneous rocks. *(Requires cognitive processing to determine the differences in the two rock types)*

DoK 3- **Describe** a model that you might use to represent the relationships that exist within the rock cycle. *(Requires deep understanding of rock cycle and a determination of how best to represent it)*
• **Explain** the offsides rule in soccer.  **Low Complexity**

• **Explain** the similarities and differences of the offsides rule in soccer and hockey.  **Moderate Complexity**

• After watching the video, **explain** how the defense used the offsides rule to their advantage.  Draw a model that represents the players’ positions in the video.  **High Complexity**
Are Complexity And Difficulty Synonymous?
Complexity vs. Difficulty

The DOK Levels refer to the complexity of mental processing that the student must use to answer the item, not the difficulty of the item.

- **Example:** A student learns the “rules” of addition and is given two problems.

  4 + 4 = easy and low complexity
  4,678,895 + 9,572,885 = difficult but still low complexity
Dok Is NOT About Difficulty

Difficulty is a reference to how many students answer a item correctly.

1. How many of you know the definition of *exaggerate*?
   DOK Low = Recall
   If all of you know the definition, this item is an easy one.

2. How many of you know the definition of *prescient*?
   DOK Low = Recall
   If most of you do not know the definition, this item is a difficult one.
Complexity vs. Difficulty

- The Depth of Knowledge levels are based on the complexity of the mental processes the student must use to find the correct answer, not the difficulty of the item!
The graph of a system of linear equations is shown below. What is the solution of the system?

A. (2,4)  
B. (4,2)  
C. (-2,4)  
D. (3,6)
What do you think? Let’s take a poll

Level of Difficulty?

Level of DoK Complexity?
One of the biggest differences between World War I and previous wars was:

A. The new technology that was used, including trenches, airplanes, and poison gas

B. The number of previously neutral nations that fought, including Spain, France, and Switzerland

C. The amount of government mandated rationing and sacrifice on the home-front, including limited access to rubber and coffee

D. The use of propaganda

- Difficulty: Easy, Medium, Hard
What do you think?

Let’s take a poll

Level of Difficulty?

Level of DoK Complexity?
In Mr. Bell’s classes, the students voted for their favorite shape to use as their class symbol. Here are the results.

Using the information in the chart, Mr. Bell must select one of the shapes to be the symbol. Which one should he select and why?

The shape Mr. Bell should select is:

<table>
<thead>
<tr>
<th></th>
<th>Class 1</th>
<th>Class 2</th>
<th>Class 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Triangle</td>
<td>9</td>
<td>14</td>
<td>11</td>
</tr>
<tr>
<td>Star</td>
<td>1</td>
<td>9</td>
<td>17</td>
</tr>
<tr>
<td>Happy Face</td>
<td>22</td>
<td>7</td>
<td>2</td>
</tr>
</tbody>
</table>

Explain:

- Difficulty: Easy, Medium, Hard
What do you think?

Let’s take a poll

Level of Difficulty?
1. Easy
2. Medium
3. Hard

Level of DoK Complexity?
1. Low
2. Moderate
3/4. High
How does Bloom’s Taxonomy compare to Webb’s DoK?

- Bloom’s Taxonomy (Old Version):
  - Knowledge
  - Comprehension
  - Application
  - Analysis
  - Synthesis
  - Evaluation

- New Version:
  - Remembering
  - Understanding
  - Applying
  - Analyzing
  - Evaluating
  - Creating

- Webb’s DOK (2002):
  - Recall and Reproduction
  - Skills and Concepts
  - Strategic Thinking
  - Extended Thinking
QUESTIONS