



Iowa
CORE 

The Role of Cognitive Complexity in Competency-Based Education

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Learning Goals/Success Criteria

Learning Goals	Success Criteria
<ul style="list-style-type: none"> • Attendees will understand... <ol style="list-style-type: none"> I. ...why alignment and cognitive complexity are important II. ...what cognitive complexity resources are available to support Iowa Core work III. ...what Webb's DOK and Hess' CRM frameworks are and how they apply to competency-based education 	<ul style="list-style-type: none"> • I can... <ol style="list-style-type: none"> A. ...explain why alignment and cognitive complexity are important B. ...explain how and where cognitive complexity resources can be found C. ...describe Webb's DOK and Hess' CRM frameworks and how they apply to competency-based education

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Setting the Context

- **Competencies must be grounded in the Iowa Core**
- **All students are required to have the opportunity to learn all of the Iowa Core**
- **The Iowa Core calls for specific types of thinking (cognitive complexity)**
- **Collectively, this means that work with competencies must be aligned to the Iowa Core**

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Iowa Core-CBE Connections From Task Force Report



- “Statewide efforts should be made to develop model competencies aligned to the Iowa Core and the universal constructs.” (p. 14, 15, 17, 20)
- “Investigating use of the Iowa Content Alignment Tool (I-CAT) to validate claims that students in competency-based environments do learn the Iowa Core and to help districts build a system of competencies that represent a guaranteed and viable curriculum. (Task force: Summer 2013)” (p. 22)
- “Professional development for teachers and administrators should include...Writing assessable competencies aligned to the Iowa Core.” (p. 24)
- “CBE is an innovative way of educating where the primary focus is not seat time, but rather demonstration of understanding of the Iowa Core standards.” (p. 29)

Task Force Report:
<http://goo.gl/LMLjA>

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Activity #1: Fun with Words



- Review the *Iowa Core – Key Curriculum Alignment Concepts/Terms*
- Keep this document handy for the remainder of the session

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Curriculum Alignment



- **Definition**
 - To paraphrase... *The extent to which and how well the content found in all curricular categories (e.g., intended, enacted, assessed) work together to guide instruction and, ultimately, facilitate and enhance student learning* (Webb, 1997).

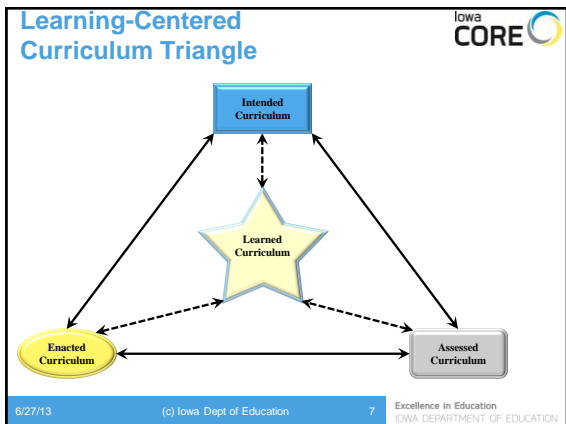


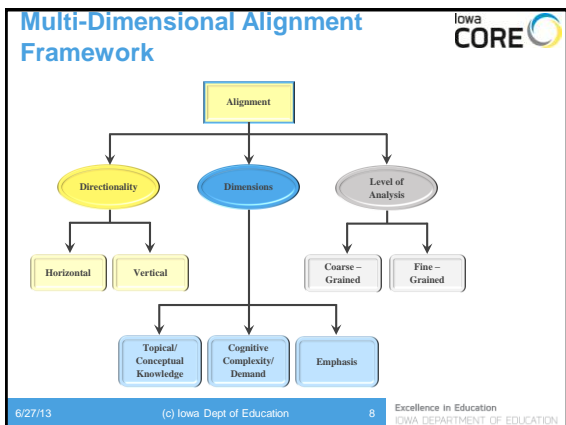
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Why Cognitive Complexity?


- **Standards and assessments**
 - don't just have topical/conceptual knowledge
 - They require different types of cognitive processing and using of those pieces of knowledge
- **Cognitive complexity is lens for understanding these expectations**
- **The Iowa Core calls for specific levels of cognitive complexity**

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Why Cognitive Complexity is Important Iowa CORE 


- **What research tells us about the impact of alignment on student outcomes:**
 - As alignment between what is taught and what is assessed increases, so, too, do student outcomes (e.g., Gamoran et al., 1997; Cohen, 1987).
 - This is true even for students with low achievement, low SES, and ethnically and culturally diverse groups.
 - This relationship is strengthened when considering cognitive complexity along with topical/conceptual knowledge

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What is Webb's DOK? Iowa CORE 

General Description	Levels/Categories
<ul style="list-style-type: none"> • Focus on standards and assessments • Part of a larger alignment framework that includes <ul style="list-style-type: none"> – Categorical Concurrence – Depth-of-Knowledge Consistency – Range-of-Knowledge Correspondence – Balance of Representation • Content-specific • Focus on context around verbs 	<ul style="list-style-type: none"> • Four-level framework • Generally, organization is less-to-more complex • Generic level labels <ol style="list-style-type: none"> 1. Recall & Reproduction 2. Skills & Concepts 3. Strategic Thinking/Reasoning 4. Extended Thinking

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DOK is about complexity—not difficulty! Iowa CORE 

- **The intended student learning outcome determines the DOK level. *What mental processing must occur?***
- **It's what comes *after the verb* that is the best indicator of the rigor level.**
 - *Describe* the process of photosynthesis.
 - *Describe* how the two political parties are alike and different.
 - *Describe* the most significant effect of WWII on the nations of Europe.

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Activity #2: Test Driving DOK



- **Review (10 minutes)**
 - The Role and Importance of Cognitive Complexity: Literacy, and
 - The Role and Importance of Cognitive Complexity: Mathematics
- **For each standard shown up on the screen**
 - Note the highest DOK you think the standard calls for
 - Compare your response to the actual DOK code assigned to the standard (will be shown after you make your mental note)

High School: S-ID.2. Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.


DOK 1, 2




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High School: G-MG.3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).★

DOK 2, 3, 4




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RL.7.2. Determine a theme or central idea of a text and analyze its development over the course of the text; provide an objective summary of the text.

DOK 2, 3


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RL.7.5. Analyze how a drama’s or poem’s form or structure (e.g., soliloquy, sonnet) contributes to its meaning.

DOK 3, 4

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Hess' Cognitive Rigor Matrix (CRM) Iowa
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- **Combined approach**
 - Combines Webb’s DOK with Bloom’s RCT to create a two-dimensional structure
 - Intended to create a more descriptive, comprehensive framework for understanding cognitive complexity

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Activity #3: Digging into Hess' CRM

Form teams of two or more

Locate Hess' Cognitive Rigor Matrix (CRM) for ELA and M-Sci

Where is Webb's DOK located on the document?

Where is Bloom's RCT located on the document?

What questions do you have about

- How the CRM is designed?
- How to use the CRM?

<http://www.nciea.org/beta-site/publications-2/>, keyword search = Hess

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Additional Considerations: Webb's DOK and Hess' CRM

Webb's DOK	Hess' CRM
<ul style="list-style-type: none"> It's the primary lens for examining cognitive complexity of the Iowa Core Instruction, assessment, and learning must get to max DOK level by the end of the school year 	<ul style="list-style-type: none"> A tool you may use to help you determine which DOK(s) your instruction and assessment get to District determines how this is/isn't used Level of Bloom's RCT can vary

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Cognitive Complexity Resources

Resource	Access
1. Webb's DOK codes added to Iowa Core Literacy Standards.	http://goo.gl/1kvB9
2. Webb's DOK codes added to Iowa Core Mathematics Standards.	http://goo.gl/NzN4G
3. Webb's DOK levels and descriptions for Reading, Writing, and Mathematics	http://goo.gl/3G7My
4. Webb's DOK codes and related tools incorporated into the I-CAT.	https://peoplebox.ace11.k12.ia.us/4DCGI/ig
5. Webb's DOK codes added to StandardsInsight.	District-specific URLs
6. Report: Webb's DOK codes assigned to Common Core Standards Literacy and Mathematics for grades 3-12.	http://goo.gl/rnKz3
7. Report: Webb's DOK codes assigned to Common Core Standards Literacy and Mathematics for grades K-2 and Iowa-specific additions.	http://goo.gl/UPgHv

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Activity #4: Making CBE Connections



1. Connect with a shoulder partner
2. Discuss the following questions:
 - a. What connections do you see between the Iowa Core, alignment, and cognitive complexity and competency based education?
 - b. What questions do you have about these relationships?

Why Are Doing Alignment Work?



- "For the system to work...its elements must be aligned. That is, if an assessment is to communicate and measure expected standards for student performance, it must be fully aligned with those standards. Similarly, if classroom teaching and learning activities are to help students attain the standards, they too must be aligned with the standards. Finally, it is only when assessment is aligned with both standards and classroom instruction that assessment results can provide sound information about both how well students are doing and how well schools and teachers within them are doing in helping students to attain the standards."

Herman, J.L., & Webb, N.M. (2007). Alignment methodologies. *Applied Measurement in Education*, 20(1), 1-5.

-Joan Herman and Noreen Webb, 2007

Closing Thoughts



- I would love to talk with you more about the issues discussed in this session.
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