Increasing Text Accessibility for Students with Significant Cognitive Disabilities

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Purposes

The goal of this presentation is to describe:

- The influences of text complexity on reading comprehension for students with significant cognitive disabilities.

- The process used to create grade-level accessible texts for the Dynamic Learning Maps (DLM) alternate assessment.

- Instructional strategies and resources to use when adapting or developing texts.

Students with Significant Cognitive Disabilities

- Display a variety of physical and communication disabilities.

- Experience a delay in skill development.

- Have working memory deficits.

- Need intensive instructional support when learning material.

- Require more time to learn novel material.

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The Dynamic Learning Maps

The DLM Alternate Assessment provides students with significant cognitive disabilities the opportunity to demonstrate learning in content areas.

The DLM system:

- Developed learning maps representing skill development in content areas.
- Adapted challenging, grade-level content standards from CCSS to meet the needs of student population.

The Dynamic Learning Maps

The DLM system: (cont'd)

- Created instructionally relevant assessments covering the adapted standards.
  - Required adapting grade-level narrative and informational texts for ELA.
  - Developed texts to target specific skills in the LM and to represent adapted standards.

Cognitive Load Theory

- Cognitive Load Theory (Sweller, van Merrienboer, & Paas, 1998) predicts how working memory constraints can impact performance.

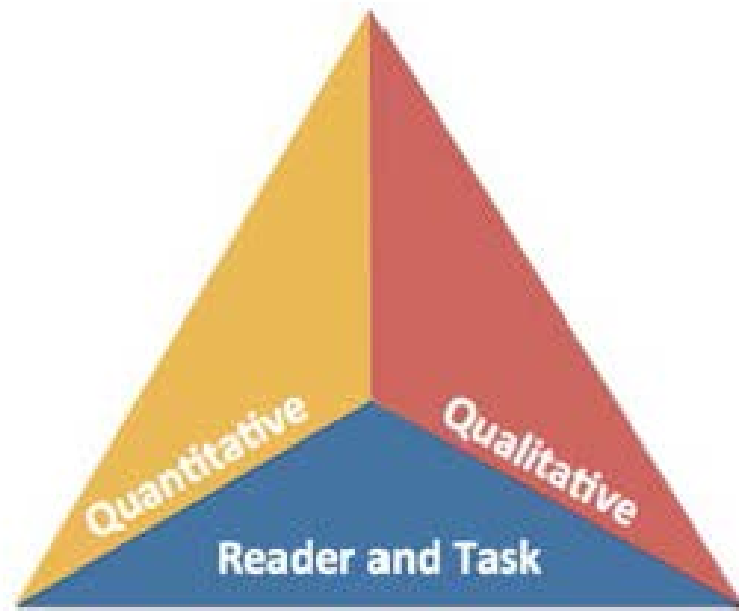- In instructional design, student characteristics determine its impact.
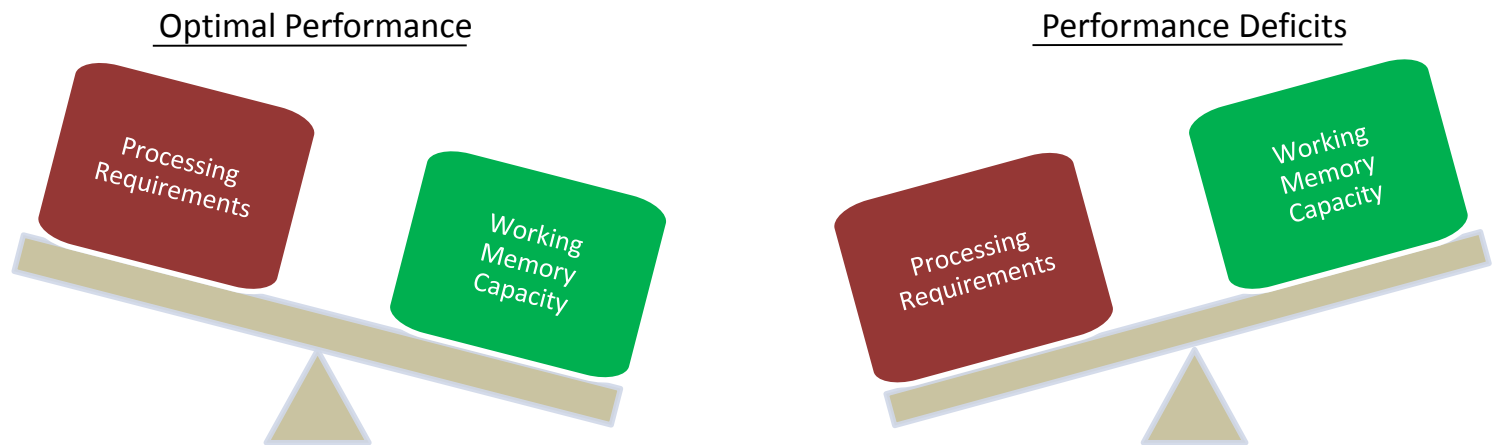
What is Text Complexity?

- Text complexity is the degree to which a passage is easy or difficult to comprehend.
- Text complexity contains multiple factors affecting all levels of a text.
- Text complexity depends on an individual's reading ability.
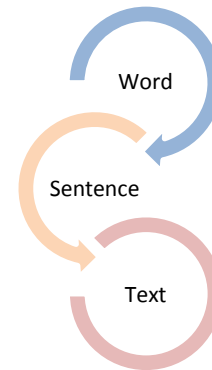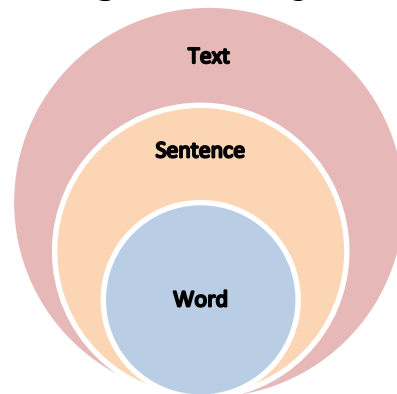
Three Factor Text Complexity Model from CCSS

Three Factor Text Complexity Model in DLM

Text Characteristics Influencing Complexity

Word-level Factors:

- Word Concreteness
  - Concrete vs. abstract words
- Word Length
  - Short vs. long words

Text Characteristics Influencing Complexity

Sentence-level Factors:

- Syntactic Complexity
  - Simple vs. complex sentences
- Negation Words
- Passive Voice
- Pronouns
  - Easily accessible vs. ambiguous pronouns

Text Characteristics Influencing Complexity

Text-level Factors:

- Text Coherence
  - Sentences/paragraphs linked together to form a single meaning
  - Example: Connectives

- Content Word Overlap
  - Words repeated in adjacent sentences

Text Development Process

- Grade-level narrative and informational texts (n = 269).
- Adjusted text complexity to meet needs of student population for grades 3-12.
- Texts were written to support assessment and be instructionally relevant.

Developed Learning Maps

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Identified Content Standards

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Adapted Texts

↓

Reviewed Internally

↓

Reviewed Externally

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Writing to Nodes in the Learning Maps

1. Identified content standard.
2. Identified learning map area.
3. Identified related target skills.
   o Example: Identify the main idea.
4. Made basic adjustments to decrease text complexity.
5. Adjusted text to include target skills.
6. Reviewed text to ensure accessibility.

Identified Content Standard

Identified Learning Map Area

Identified Target Skills

Adapted Texts - Basic

Adapted Text - Standard-based

Reviewed Text

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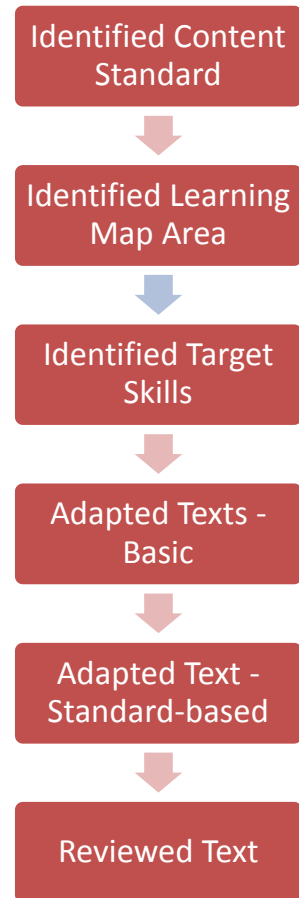
Adapting Texts

- The texts should:
  - Contain clear language
  - Minimize the need for inferences and prior knowledge
  - Avoid using unnecessary, confusing, or distracting verbiage.
- A relevant photo accompanied the text.
- The text's content provide an appropriate level of challenge.
- Texts became more complex over grades.

Core Vocabulary

- Core vocabulary
  - Familiar words > Unfamiliar words
  - Concrete words > Abstract words
  - Short words > Long words

Trains move people and things.

Trains run on tracks.

Trains have wheels. The wheels roll on the tracks.

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The engineer drives the train. He wears a hat.

Trains have engines at the front. The engines pull the train cars.

Old trains had steam engines.

Now most trains have diesel engines.

Some trains carry things in freight cars.

Some trains carry people in passenger cars.

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Trains cross bridges.

Trains go through tunnels.

Trains move people and things.

Writing for Fluency and Comprehension

- Limiting inference and interference
  - Easily identifiable pronouns
  - High text cohesion
  - Large content word overlap
  - Sentences with a single, literal meaning

Joe and Emma were brother and sister.

Joe and Emma wanted a pet.

Joe asked Mom if they could have a puppy.

Emma asked Mom if they could have a puppy.

Joe and Emma told Mom they would take care of the puppy.

Joe said he would feed the puppy.

Emma said she would give the puppy water.

Negations, Pronouns and the Passive Voice

- Negation Words
    - Limited the number of negation words
- Pronouns
    - Used pronouns sparingly
    - Used only pronouns with clear antecedent
    - Pronoun always located near antecedent
- Passive Voice
    - Active voice > Passive voice

Limiting Syntactic Complexity

- ## Syntactic Complexity
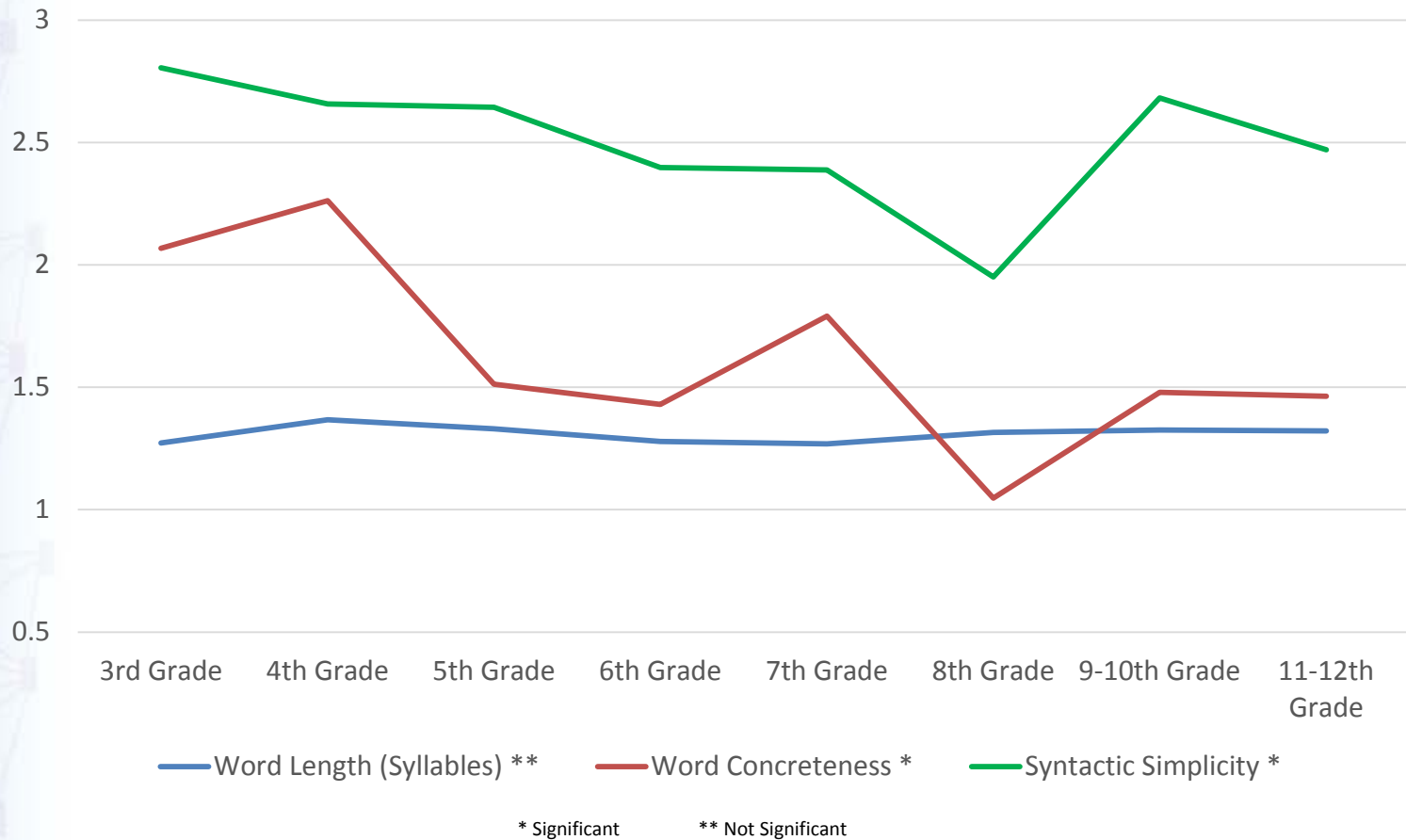 - o Used only simple sentences

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Example

Heidi was a young girl. Heidi lived with her grandfather. Heidi and her grandfather lived in a small house on the top of a mountain. Heidi loved the things on the mountain. There were flowers on the mountain. There were rocks on the mountain.

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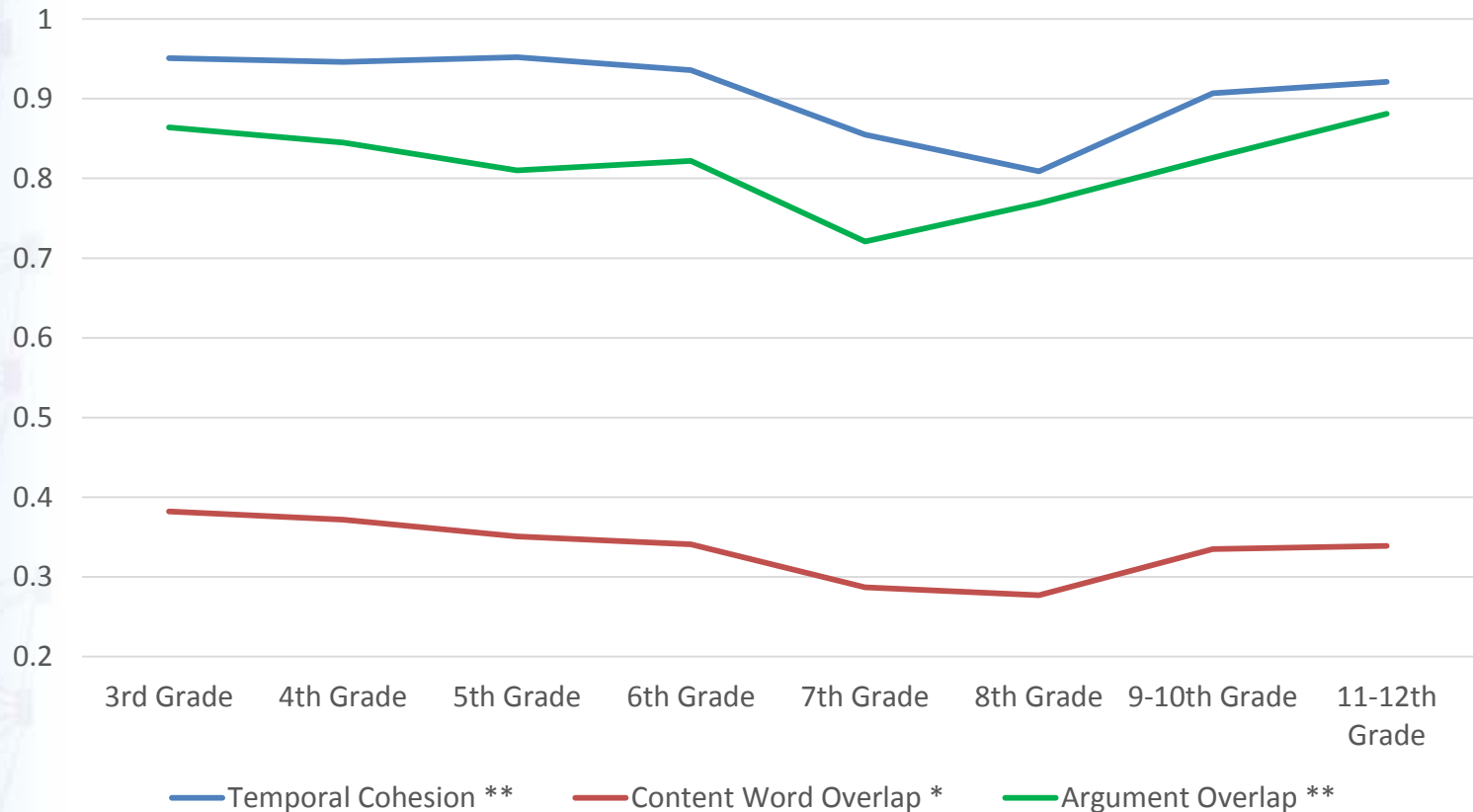
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Evaluating DLM Texts

- Coh-Metrix (McNamara et al., 2013) analyzed the text complexity of the adapted grade-level DLM narrative and informational texts.
  - It contains multiple measures of each factor.
  - We focused on factors used to develop texts.
- Evaluated Coh-Metrix values for each factor to determine if they differed across grades.
- Compared Coh-Metrix findings with the goals used to develop more accessible texts for students with significant cognitive disabilities.
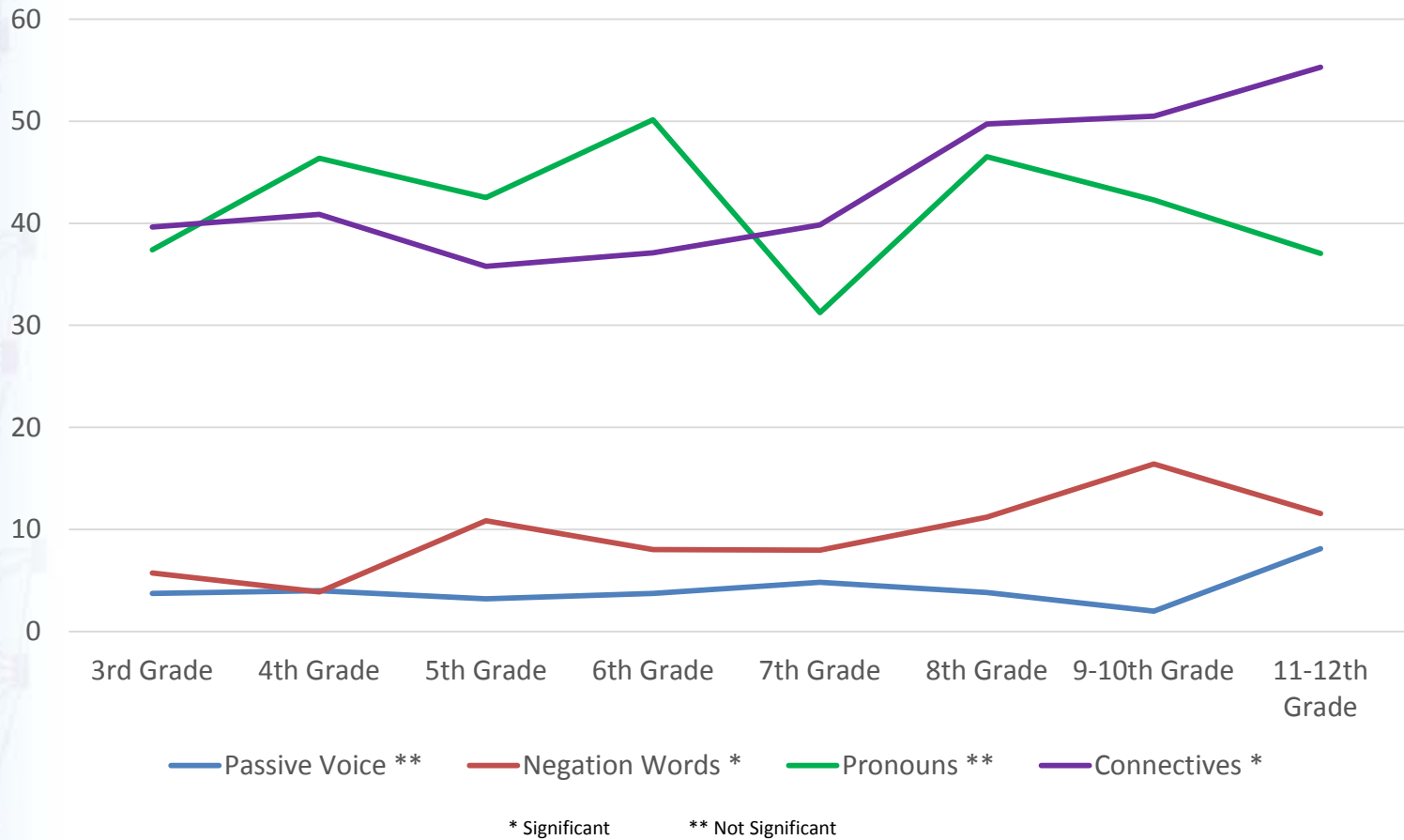
Text Complexity Factor Level per Grade

Legend:
— Word Length (Syllables) **   — Word Concreteness *   — Syntactic Simplicity *

* Significant   ** Not Significant

Text Complexity Factor Level per Grade

* Significant   ** Not Significant

Text Complexity Factor Incidence per Grade

* Significant   ** Not Significant

DLM Text Evaluation Summary

- Word-level Text Complexity Factors
  - Similar incidence of short, familiar words across grades.
  - Slightly higher incidence of more abstract words with increasing grades.

DLM Text Evaluation Summary

- Sentence-level Text Complexity Factors
  - Slightly higher incidence of more complex sentences with increasing grades.
  - Low incidence of passive voice verbs across grades.
  - High incidence of pronouns across grades.
  - Slightly higher incidence of negation words with increasing grades.

DLM Text Evaluation Summary

- Text-level Text Complexity Factors
  - o High incidence of noun/pronoun overlap in adjacent sentences across grades.
  - o High incidence of temporal cohesion between sentences across grades.
  - o Increased incidence of connectives with increasing grades.

Teacher Impressions

- During field testing (2014) teachers were surveyed about ELA assessments

- 1,402 teachers completed surveys for 4,077 students

ELA Field Test 1 Text Complexity

Resource	Number	Percent
Not complex enough	384	9.4%
Appropriate complexity	2,303	56.2%
Too complex	1,412	34.5%

DLM Text Development Conclusions

- Adjusting the complexity of grade-level texts can make them more accessible for students with significant cognitive disabilities.
  - Permits students to demonstrate academic skills without any excessive and unnecessary processing requirements.
- Writing guidelines and resources can help teachers and educators adapt or develop texts for all students.
- A student's reading characteristics should guide text development.
- Texts can be adjusted across grades to reflect student learning.

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Using Adapted Texts

- Use grade-level appropriate content

- Use simplified text structure to reduce cognitive load

- Use simplified vocabulary and syntax to reduce cognitive load

- Example Books & Guides
  - http://dynamiclearningmaps.org/content/familiar_texts_single_ee_im

Resources and Materials

- Tar Heel Reader
  - http://tarheelreader.org/
- Example Books and Familiar Text Guides
  - http://dynamiclearningmaps.org/content/familiar_texts_single_ee_im
- Coh-Metrix
  - http://cohmetrix.com/

THANK YOU!

For more information, go to:
www.dynamiclearningmaps.org

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