What the Research Says About Text Difficulty and Knowledge: What Helps Struggling Readers

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The Problem: Literacy

64% of 4th graders aren’t proficient in reading
(NAEP, 2015)

The Diagnosis: Many Texts are Too Hard

(Biancarosa & Snow, 2006; Compton et al., 2014; Kamil et al., 2008; Vaughn et al., 2015)

The Solution: Instructional Level Texts

Definition
• Highest level a student can read with support

Word Recognition
• 95%-98% accuracy

Comprehension
• 75%-89% comprehension

(Betts, 1946; McKinna & Stahl, 2015)
The Result: Text Leveling Systems

NEWSELA

Unintended Consequences: Leveling Mania

FINDS A BOOK OVER 250 PAGES
HAS A LEXILE SCORE OF 1090
WHAT THE HECK
IS LEXILE LEVEL?

(Dzaldov & Peterson, 2005; Kontovouki, 2012)

Wait, are we asking the right questions?

1. What makes a text hard or easy?
2. Does giving students a simplified version of a text improve their comprehension of that particular text?
3. Does giving students “instructional level” texts over time improve their overall comprehension ability?

1. What makes a text easy or hard?

Text Difficulty
• “The degree of challenge the text presents to the reader”
  (Fang, 2017)

Text Complexity
• “The textual elements or factors that can be analyzed, studied, or manipulated”
  (Mesmer, Hiebert, & Cunningham, 2014)
What makes a text complex?

Word Level
Sentence Level
Discourse Structure
Narrativity
Cohesion
Genre

(Graesser et al., 2011; Givon, 1995; Halliday & Hassan, 1976/2013; Mesmer et al., 2012)

What is cohesion and why does it matter?

• Halliday and Hasan (1976/2013) describe cohesion as “the difference between a text and a collection of unrelated sentences,” (p.1).

What is Readability?

Sentence length
Word frequency
Word length


New Tools

• Text evaluator: textevaluator.ets.org
• Coh-Metrix: cohmetrix.com
What makes a text difficult?

- Concepts
- Vocabulary
- Cohesion

Instruction, the Task, and Background Knowledge Matter too

How do simplified Newsela texts compare to the more challenging versions?

<table>
<thead>
<tr>
<th>“Easy” Texts</th>
<th>“Challenging” Texts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newsela level: 5th–6th grade</td>
<td>Newsela level: 9th–12th grade</td>
</tr>
<tr>
<td>Lexile: 790–970</td>
<td>Lexile: 1120–1250</td>
</tr>
<tr>
<td>CCSS grade band: 4th–5th</td>
<td>CCSS grade band: 9th–10th</td>
</tr>
</tbody>
</table>

Results: Word Level

<table>
<thead>
<tr>
<th>Word Level</th>
<th>Easy</th>
<th>Challenging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean log word frequency</td>
<td>3.03</td>
<td>2.927*</td>
</tr>
<tr>
<td>Age of acquisition</td>
<td>330.363</td>
<td>357.617*</td>
</tr>
<tr>
<td>Familiarity of content words</td>
<td>572.798</td>
<td>564.798*</td>
</tr>
<tr>
<td>Polysyntactic</td>
<td>4.120*</td>
<td>3.717</td>
</tr>
<tr>
<td>Concreteness Z score</td>
<td>1.164</td>
<td>1.49</td>
</tr>
<tr>
<td>Imagability</td>
<td>425.535</td>
<td>422.942</td>
</tr>
</tbody>
</table>

The easier texts contained more familiar words but...

*Lupo & Tortorelli, 2017*
Results: Sentence Level

<table>
<thead>
<tr>
<th>Sentence Level</th>
<th>Easy</th>
<th>Challenging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sentence length</td>
<td>11.968</td>
<td>16.31*</td>
</tr>
<tr>
<td>Syntactical simplicity</td>
<td>.995</td>
<td>.284*</td>
</tr>
</tbody>
</table>

*p < .01

Results: Discourse Structure

<table>
<thead>
<tr>
<th>Discourse Level</th>
<th>Easy</th>
<th>Challenging</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passage length</td>
<td>662.46</td>
<td>879.08*</td>
</tr>
<tr>
<td>Narrativity</td>
<td>-.270</td>
<td>-.605*</td>
</tr>
<tr>
<td>Referential cohesion</td>
<td>-.604</td>
<td>-1.298*</td>
</tr>
<tr>
<td>Deep cohesion</td>
<td>.042</td>
<td>.084</td>
</tr>
<tr>
<td>L2 Readability</td>
<td>19.241</td>
<td>10.570*</td>
</tr>
</tbody>
</table>

*p < .01

English Language Learners

Word frequency and familiarity + Syntactic complexity + Cohesion = L2 Readability Score

English Proficiency Matters

(Bunch, Pearson, & Wolqui, 2014; Crossley, Greenfield, & McNamara, 2008; Crossley et al., 2011; Eslami, 2014)

1. What Makes a Text Easy or Hard?

- Vocabulary, sentence structure, cohesion
- But easier sentences can lower cohesion
- Concepts
- Very careful with simplified texts
- They are harder in some ways than more challenging versions

(Bunch, Willison, & Bunch, 2017; Crossley, 2010; Crossley & Greenfield, 2006; Crossley et al., 2011; Eslami, 2014)
2. Does giving students a simplified version of a text improve their comprehension of that particular text?

- More familiar vocabulary may make a text easier (Arya et al., 2011; Stahl et al., 1986, 1989)
- Less cohesive texts are harder to read BUT students generate better inferences (McNamara, Oruzu, & Floyd, 2011; McNamara, D. Kintsch, Butler-Songer, & W. Kintsch, 1996)
- Easier readability AND cohesion improve comprehension (Reed & Kershaw Herrara, 2016)

- BUT: Knowledge matters

What if we provide instruction, then are simplified texts easier to read?

- Denton and colleagues (2017)
- McKeown and colleagues (1992)
- Sinatra and colleagues (1993)
- Lupo (2017)

Participants and Design

<table>
<thead>
<tr>
<th>Teachers and Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>9th grade English teachers at three high schools</td>
</tr>
<tr>
<td>Honors, &quot;regular&quot;, and remedial English classes</td>
</tr>
<tr>
<td>318 9th graders</td>
</tr>
<tr>
<td>36% identified as ELLs</td>
</tr>
<tr>
<td>13% identified as disabled</td>
</tr>
<tr>
<td>66% read below grade level</td>
</tr>
</tbody>
</table>

Text Difficulty Conditions

- **NEWSELA**
  - 12 Science Texts
    - Easy: 100L, 800L, 640L
    - Challenging: 1200L
  - 12 Social Studies Texts

(Lupo, 2017)
Results

- No differences in comprehension based on text level
  - even for below grade level readers
- Students performed better in KWL treatment
  - Half a standard deviation

3. Does giving students “instructional level” texts over time improve overall comprehension ability?

**Instructional level texts:**
- When we ease of burden of reading, reading is easier (Gough & Tunmer, 1986; Lallbrege & Samuels, 1972)
- This will lead to more reading, which will improve overall comprehension ability (Allington, 2002, 2007, 2013; Barth et al., 2014; O’Connor et al., 2002, 2016)

**Challenging texts:**
- Will provide exposure to challenging vocabulary and text structure (Fang, 2016)
- Necessary to improve inferencing ability (McNamara, 2012)
- Limiting exposure to challenging texts will stunt comprehension growth (Miller & McKenna, 2016; Willingham, 2006)
3. Does giving students “instructional level” texts over time improve overall comprehension ability?

- Improves fluency, but not comprehension (Barth et al., 2014; O'Connor et al., 2002, 2010)
- Reading and comprehension instruction helps (Swanson et al., 2017)
  - But we aren’t providing this much! (Swanson, 2016)
  - We don’t know (Denton et al., 2017)

Results

- Low proficiency ELLs and students who read 4+ grades below the ninth grade made progress no matter what
- Higher proficiency ELLs and “just” below grade level readers made growth when they read challenging texts

<table>
<thead>
<tr>
<th>Comprehension Proficiency: Average Difference Scores on GMRT-4</th>
<th>KWL</th>
<th>LRD</th>
<th>Easy Test</th>
<th>Challenging Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Students (n = 219)</td>
<td>3.14</td>
<td>3.98</td>
<td>5.63</td>
<td>2.42</td>
</tr>
<tr>
<td>ELA ELP proficiency 2-4 (n = 80)</td>
<td>5.2</td>
<td>-1.7</td>
<td>-1.35</td>
<td>7.47</td>
</tr>
<tr>
<td>ELA ELP proficiency 5-6 (n = 57)</td>
<td>5.2</td>
<td>-1.7</td>
<td>-1.35</td>
<td>7.47</td>
</tr>
<tr>
<td>Not classified as ELLs (n = 131)</td>
<td>-1.19</td>
<td>-1.3</td>
<td>-0.89</td>
<td>-0.28</td>
</tr>
<tr>
<td>Students with disabilities (n = 37)</td>
<td>3.55</td>
<td>3.5</td>
<td>4.00</td>
<td>1.20</td>
</tr>
<tr>
<td>Students without disabilities (n = 182)</td>
<td>1.88</td>
<td>1.0</td>
<td>1.58</td>
<td>1.78</td>
</tr>
<tr>
<td>Far Below Grade Level Readers (n = 80)</td>
<td>4.63</td>
<td>6.25</td>
<td>5.63</td>
<td>5.20</td>
</tr>
<tr>
<td>Near Grade Level Readers (n = 56)</td>
<td>-2.16</td>
<td>-3.7</td>
<td>-1.50</td>
<td>0.37</td>
</tr>
<tr>
<td>At or Above Grade Level Readers (n = 81)</td>
<td>-1.55</td>
<td>-2.13</td>
<td>-3.63</td>
<td>-3.71</td>
</tr>
</tbody>
</table>

(Lupo, 2017)

What if just right is just wrong?

- James Hoffman, Reading Teacher (2017)
- Three Myths about Reading Level (Schwanenflugel & Knapp, 2017)
  - [https://www.psychologytoday.com/blog/reading-minds/201702/three-myths-about-reading-levels](https://www.psychologytoday.com/blog/reading-minds/201702/three-myths-about-reading-levels)
- According to Shanahan, there is no research to support instructional level theory

(Lupo, 2017)
2 & 3: Do easier texts improve comprehension?

- Easier vocabulary and cohesion improves comprehension of text
- Less cohesive (harder) texts are necessary for inferencing
- Background knowledge mediates text level
- Research has yet to show that overtime students will improve comprehension when reading easier (instructional level) texts

ALL students need BOTH

Challenging Texts | Easier Texts
---|---
To build background knowledge | To build confidence
To play students opportunities to review content | To give students opportunities to review content

Why did KWL Work Better?

- Participatory Approach
  - (Alvermann & Eakle, 2003)

- Transmission Approach
  - Directed Reading and Thinking Activity (DR-TH)
  - Reciprocal Teaching
  - Listen Read Discuss (LRD)

Struggling readers need time in texts with comprehension instruction

- On grade level 4th graders
- Below grade level fourth graders

(Guthrie, 2004)
Was it the implementation?

<table>
<thead>
<tr>
<th>Number of Cases</th>
<th>Before</th>
<th>During</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lupo (2017)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Was LRD a distractor rather than an aid?

(Stahl et al., 1989)

Was it talk?

Students talked more in KWL than in LRD

(Juzwik et al., 2013, Mercer & Littleton, 2007)

Classroom Talk
Analysis of Questions

<table>
<thead>
<tr>
<th>Fact Based Purpose</th>
<th>Example</th>
<th>KWL</th>
<th>LRD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activate students’ knowledge</td>
<td>What is cement used for?</td>
<td>Often</td>
<td>Sometimes</td>
</tr>
<tr>
<td>Relate topic to students’ lives</td>
<td>Do you need a vaccine before coming to school?</td>
<td>Often</td>
<td>Rarely</td>
</tr>
<tr>
<td>Discuss facts presented in the lesson</td>
<td>What did the video say about the uses of phosphorescent cement?</td>
<td>Never</td>
<td>Often</td>
</tr>
<tr>
<td>Ask students to elaborate their responses</td>
<td>You mentioned glow sticks at a party. What makes it glow?</td>
<td>Sometimes</td>
<td>Never</td>
</tr>
<tr>
<td>Ask students to evaluate their own responses</td>
<td>You mentioned a cure for Ebola. Is there a cure?</td>
<td>Sometimes</td>
<td>Never</td>
</tr>
</tbody>
</table>

(Lupo, 2017)

Student Talk

Student Exploratory Talk by Treatment and Lesson Segment

<table>
<thead>
<tr>
<th>KWL Before</th>
<th>LRD Before</th>
<th>KWL After</th>
<th>LRD After</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 (7)</td>
<td>15 (19)</td>
<td>43 (18)</td>
<td>56 (10)</td>
</tr>
</tbody>
</table>

Students discuss the text “Because they haven’t had signs of Ebola for a while and they thought that it was completely gone. It came out of nowhere and they didn’t have an vaccine to kill the disease.”

Students ask questions “Karen asks about whether or not Sandy Hook was decontaminated or was violence.”

Students discuss vocabulary, speculate, make analogies, share opinions, make connections to other text, and share stories. “So 2,500 died. That’s how many people go to our high school and Glenlake high school combined.”

In parenthesis the average number of occurrences of exploratory talk asked per hour is indicated.

(Lupo, 2017)

Irrelevant and Incorrect Knowledge

Student Knowledge Related Talk by Treatment and Lesson Segment

<table>
<thead>
<tr>
<th>KWL Before</th>
<th>LRD Before</th>
<th>KWL After</th>
<th>LRD After</th>
</tr>
</thead>
<tbody>
<tr>
<td>361 (52)</td>
<td>34 (5)</td>
<td>315 (33)</td>
<td>23 (2)</td>
</tr>
</tbody>
</table>

Students share factual background knowledge “Kate shares that prisoners in concentration camps were gassed or starved to death.”

Students share facts from the lesson that were not introduced in the text “After watching the video, Ash explains that [Jupiter] is 10 times the size of earth and made of hydrogen and helium.”

Students share incorrect knowledge “You can get Ebola from your pet fish.”

Students share irrelevant knowledge “You have an off topic conversation about sending pregnant women into space.”

(Lupo, 2017)

Irrelevant and Incorrect Knowledge

Student Knowledge Related Talk by Treatment and Lesson Segment

<table>
<thead>
<tr>
<th>KWL Before</th>
<th>LRD Before</th>
<th>KWL After</th>
<th>LRD After</th>
</tr>
</thead>
<tbody>
<tr>
<td>395 (39)</td>
<td>85 (12)</td>
<td>63 (8)</td>
<td>7 (1)</td>
</tr>
</tbody>
</table>

Students share factual background knowledge “Kate shares that prisoners in concentration camps were gassed or starved to death.”

Students share facts from the lesson that were not introduced in the text “After watching the video, Ash explains that [Jupiter] is 10 times the size of earth and made of hydrogen and helium.”

Students share incorrect knowledge “You can get Ebola from your pet fish.”

Students share irrelevant knowledge “Students have an off topic conversation about sending pregnant women into space.”

(Lupo, 2017)
Is knowledge best acquired from the text?

Anderson, 2013; Pressley & Aflerbach, 1995)

How to Improve Comprehension for Struggling Readers

- Provide easier and challenging connected texts
- Chunk texts
- Support thinking during reading
- Activate knowledge/engagement through discussion

Improve Students’ Comprehension

Ways to Build and Activate Knowledge

- Anticipation Guides
- Discussion to Activate Knowledge
- Drawing
- Share facts and then have students interact with the info by:
  - use think pair shares
  - small group discussion
  - Activities that enable students to process and learn the info shared
- Read related texts or watch video clips to:
  - Garner interest in a topic
  - Build specific knowledge
  - Relate a topic to students’ lives

Setting a Purpose: Be Captain Obvious

THAT'S A ROCK!

YOU ARE FALLING TO YOUR DEATH!

CAPTAIN OBVIOUS!
Rethinking Text Sets

- Text Difficulty
- Background Knowledge

Reading Volume

Motivation

Reading Experience

Comprehension Goals

<table>
<thead>
<tr>
<th>Goals</th>
<th>Actions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase text volume</td>
<td>Use a set of related texts</td>
</tr>
<tr>
<td>Embrace complexity</td>
<td>Select a challenging target</td>
</tr>
<tr>
<td>Build knowledge</td>
<td>Include visual texts and simpler information texts</td>
</tr>
<tr>
<td>Target motivation</td>
<td>Deliberately select a text to garner buy-in</td>
</tr>
</tbody>
</table>

Reading Volume

- Better Readers Read More
- Ease of Reading Makes Reading More Likely
- Time Spent Reading Enhances Knowledge
- Knowledge Makes Reading Easier

With Supports

Text 1: Challenging content-area "target" text

Text 2: Visual or video text to activate or build background knowledge

Text 3: Informational text(s) to provide additional background knowledge and opportunities for connections and differentiation

Text 4: Contemporary young adult fiction or nonfiction text chosen for its relationship to overarching themes or unit purposes
Science Quad Text Set

- Video: Crash Course in Predators
- Info Text: What Would You Do With a Tail Like This?
- YA: Who Would Win Series
- Textbook Chapter on adaptations

Chinking

- Divide a text into smaller “chunks”
- Chunks may be uneven in size
- Provide supports between readings of chunks
Support Thinking During Reading

- Think Alouds
- Reading Guides
- DR-TA

Support Vocabulary

- Before Reading
  - Student Friendly definition
  - Examples and non-examples
  - Visuals
  - Multiple contexts
- Strategies:
  - Semantic Feature Analysis
  - Concept Sorts
  - List Group Label
  - Probable Passage

Keep in Touch!

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