


Cognitive Overload!

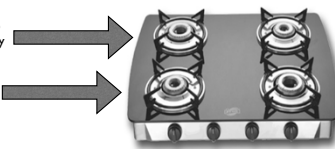
Multiple Demands of the Student Writer




ARA Literacy Conference • November 17, 2016
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What if your brain were a stove?

- back burners = things you do automatically, without actively thinking about them
- front burners = things you must concentrate actively to do



Elements of Written Language

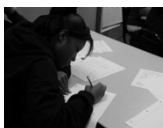


"Writing is the act of dealing with an excessive number of simultaneous demands or constraints. Viewed this way, a writer in the act is a thinker on full-time cognitive overload."

(Flower and Hayes as cited by Torrance and Galbraith, *Writing Research*, 67)

Larson, G. (1986). Mr. Larson, may I be excused? My brain is full (cartoon). Retrieved from <http://infofile.blogspot.com/>

Elements of Written Language




Writing is not merely expressing ideas but also developing them.

(Tolchinsky, *Writing Research*, 86)


Elements of Written Language

- motor component
- spelling
- mechanics
- syntax** (arrangement of words to form sentences)
- vocabulary** (words in a person's active/expressive vocabulary)
- oral language
- text structure** (paragraph/essay construction)
- recursive processes** (planning/revising/editing)
- audience
- content



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transcription skills ≠ intelligence

Motor Component


Requires...

- recall of how the letter(s) look
- coordination to replicate that visual recall
- assessment of space requirements
- combination of accuracy and speed = fluency




Handwriting Impacts Writing

- Students in grades K-3 benefit from direct and explicit handwriting instruction. (Graham, 2009-10)
- Handwriting in students 3rd grade and below (both regular ed and LD) may impede text generation. (Graham, 2009-10)
- "...rapid, legible, and comfortable handwriting facilitates writing production." (Mather et al, 2009)
- Automatized handwriting significantly improves both the quantity and quality of writing. (Berninger 2012; Graham, 2009-10)




Steve Graham



Nancy Mather

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Motor Component



I DON'T HAVE BAD HANDWRITING. I HAVE MY OWN FONT.

Handwriting Impacts Reading

- "Learning to form letters by hand improves perception of letters and contributes to better reading and spelling." (Berninger, 2012)
- "Writing is essential for developing the networks involved in letter processing." (James, Jao, & Berninger, 2016)
- "...learning to write and perceive letters during early childhood may affect learning to spell and read words during middle childhood." (James, Jao, & Berninger, 2016)



Virginia Berninger

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Handwriting Instruction ▶ Lasting Effects


- "In grades 4 to 6, handwriting fluency still accounts for 42 percent of the variability in the quality of children's writing..." (Graham, 2009-10)
- "...students' handwriting speed continues to increase at least until Grade 9." (Graham, 2009-10)
- OK MK In three separate studies, researchers found that college students who took notes by hand performed better on assessments than their peers who typed their notes. (Hotz, 2016)

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Motor Component: Findings from a Survey of Teachers

- 90% of 1st-3rd grade teachers teach handwriting.
- More than half agreed that it is important.
- 39% of teachers said their students' handwriting was adequate.
- 12% believe they received adequate preparation to teach handwriting in their college education courses.

Graham & colleagues (American Educator, 2009-10)



Motor Component

➤ Direct instruction is key!

- manuscript
- cursive
- keyboarding

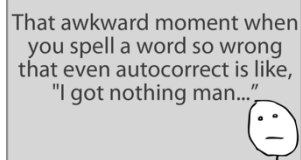


Cursive for LD Students

- An argument for cursive for students with dyslexia
 - cuts down on reversals (cursive b/d, m/w, etc.)
 - in a proper lowercase alphabet, all letters begin on baseline *a*
 - spelling is better reinforced in the mind if continuous movement of cursive is used
 - reading is strengthened through writing
 - forces appropriate clustering of letters to create words and spacing between words

When to Give Up

- When does the computer come into play?
 - when to give up with a student who has poor handwriting
 - dysgraphia
 - technological solutions
 - word processors
 - text prediction
 - voice activated software



Keyboarding

Although transcription skills (handwriting and spelling) are key to preventing future writing problems, keyboarding is as essential as writing with pen(cil) in the 21st century.
(McArthur, Graham, Fitzgerald, 2006)

Students should develop keyboarding competency

- when they begin composing and submitting written work on the computer
- using direct, explicit instruction by a trained instructor
- in *addition to* rather than *instead of* handwriting instruction

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Keyboarding...



does NOT replace manuscript/cursive!

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Word Processing

- Widely used in general population
- Adapted to writing theories as a cognitive process involving recursive cycles of planning, drafting and revising
- Supports social processes
 - Opportunities for publication
 - Opportunities for collaborative writing

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Writing Next Word Processing Data

- Useful for collaborative writing and when teachers guide word processing instruction
- Produces neat, legible writing
- Allows writers to add, delete, and move text easily
- Includes spelling checkers
- Shows moderate impact for students in general (effect size = .51)
- Shows significant impact for low-achieving writers (effect size = .70) – WOW!!

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Assistive Technology for Struggling Writers

- Word Processing
- Supports motivation, mechanics, appearance, revision
- Spelling Checkers
- Speech Synthesis (text-to-speech software)
- Word Correction
- Speech Recognition

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Assistive Technology - Text To Speech

Defined:

Reads digital text out loud for the student

Examples:

- BookShare
- CoWriter
- Kurzweil 3000
- Microsoft Word
- OS Accessibility features
- Natural Reader
- Prizmo
- Read & Write
- Read2Go
- Voice Dream Reader
- Wacom Reading Pens
- WriteOutloud
- WYNW

Uses:

- Access to printed text
- Some text-to-speech tools allow students to proofread written work
- Independence in reading tasks

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Spelling

- A convincing argument for teaching students to spell...



Spelling: Research says...

Some researchers believe that spellers may “overwrite” existing phonologically-stored information in order to sound out or spell a word of which they are uncertain.

(Torrance and Galbraith, *Writing Research*, 72)

If this is true, in the process, they will lose or damage the remainder of the sentence they plan to write.



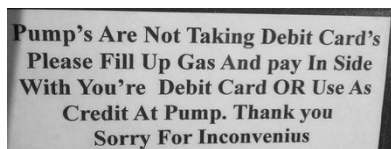
Importance of Automaticity

“Typical writers compose in bursts of writing activity broken by long production pauses...In typically developing children bursts can be constrained by transcription bottlenecks in processing such as slow handwriting or spelling.” (Alves, Branco, Castro, and Olive 2012 as cited in Connelly and Dockrell 2016)

Automaticity – occurs without voluntary control and interferes minimally with other processes (Pashler, 1994b as cited in Torrance and Galbraith 2006)

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How do you perceive the writer?



Pump's Are Not Taking Debit Card's
Please Fill Up Gas And pay In Side
With You're Debit Card OR Use As
Credit At Pump. Thank you
Sorry For Inconvenius

Spelling impacts writing.

- Spelling errors can change the message.
- Poor spelling negatively impacts perceptions about a child's competence as a writer.
- Poor spelling interferes with composing.
- Early problems with spelling can constrain a child's development as a writer. (Graham, 1999)

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Spelling

➤ Why is it more difficult than reading?

- creation versus recognition
- lack of one-to-one correspondence

Research shows...

"Brain research shows common and unique brain activation during tasks requiring storage and processing of phonological word forms (heard and spoken words), orthographic word forms (viewed and written words), and morphological word forms (bases and affixes in both oral and written words) and evidence for cross-code integration of these three word forms in response to spelling instruction."

Richards et al., 2006 as cited by James, Jao, and Berninger 2016).

Good teachers of spelling...

- develop a knowledge of the phonology, orthography, and morphology of English.
- learn best practices in teaching students in these areas.
- become confident in identifying phonological, orthographic, and morphological errors in student spelling and writing.
- connect intervention to specific errors.

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Good teachers of spelling...

- teach often to the whole class, in small groups, and with individual students; this includes... teaching more basic writing skills.
- model, explain, and provide guided assistance when teaching.

(Graham, James, and Chambers. Evidence-Based Practice and Writing Instruction: A Review of Reviews. 221)



Students need to...

- develop a knowledge of the phonology, orthography, and morphology of English.
- be taught how to spell words they frequently use when writing.
- learn how to generate plausible spellings for unknown words.
- know how to check and correct any spelling miscues that occur.

(Troia as cited in MacArthur, Graham, and Fitzgerald 2006)



Motor Component & Spelling: Research says...

“Well-practiced components of the writing system -- the motor planning necessary for keyboarding by a competent typist, for example -- will run successfully while making very limited demands on cognitive capacity. Other components...may make much higher demands.”

(Torrance & Galbraith, *Writing Research*, 69)



Motor Component & Spelling: Commonalities

- lower level tasks
- often mask true ability
- often inhibit potential ability
- visual representation of adequacy/inadequacy
- only required of written communication



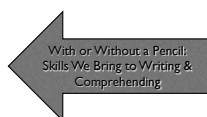
Mechanics

- capitalization
- punctuation
- syntax



Elements of Written Language

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Higher Level Mechanics

➤ Example 1:

Let's eat grandpa.

Let's eat, grandpa.

➤ Example 2:

The democrats say the republicans will lose the election.

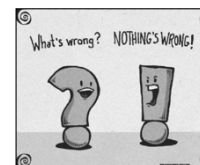
The democrats, say the republicans, will lose the election.

Usage = Syntax

- Let's define syntax as "the predictable patterns of language that are found in sentences" (Mather, Wendling, Roberts 19).
- If this is how we define syntax, then most punctuation and some capitalization is chosen as a part of syntax.
- Thus, we will define "usage" as "syntax."

Usage = Syntax

- The level of sophistication of a piece of writing is largely influenced by the ability to vary sentence structure.
- This is the key to good syntax.



Syntax

- Sentence variety is key.
 - Using different kinds of sentences (simple, compound, complex, compound-complex)
 - Varying order (locating phrases and clauses in different places)

Syntax

How we speak and listen...an example

- At the end of the day, _____.
- We ate _____.
- Why does Yoda sound so cool/weird?

Usage = Syntax: Research says...

- Sentence combining activities improve student writing.
 - William Strong pioneered this work.

Sentence Combining: Example #1

- The man went to the store.
 - He was ugly.



Sentence Combining: Example #1

- The man went to the store.
- He was ugly.
- The ugly man went to the store.



Sentence Combining: Example #2

- I have a lot of fond memories of high school.
- I was not the most well behaved student during my tenure there.



Sentence Combining: Example #2

- I have a lot of fond memories of high school though I was not the most well behaved student during my tenure there.
- I have a lot of fond memories of high school, but I was not the most well behaved student during my tenure there.
- I have a lot of fond memories of high school; however, I was not the most well behaved student during my tenure there.



Grammar Instruction

- Research indicates that instructors must know much more about sentence structure, including syntax and grammar, than do their students in order to provide effective writing instruction.
- Research also indicates that grammar taught in isolation does not improve writing.
- In order for grammar instruction to be useful to students, it must be taught in the context of developing their writing.



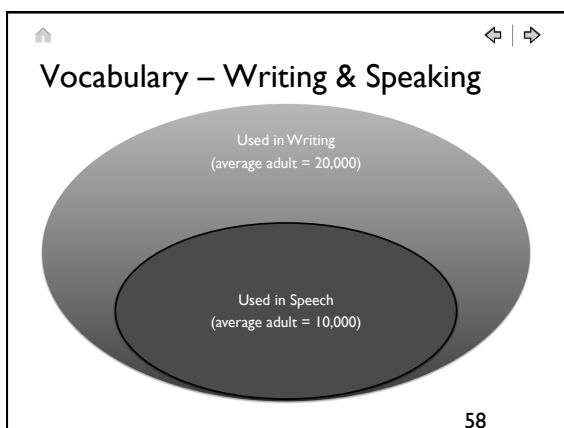
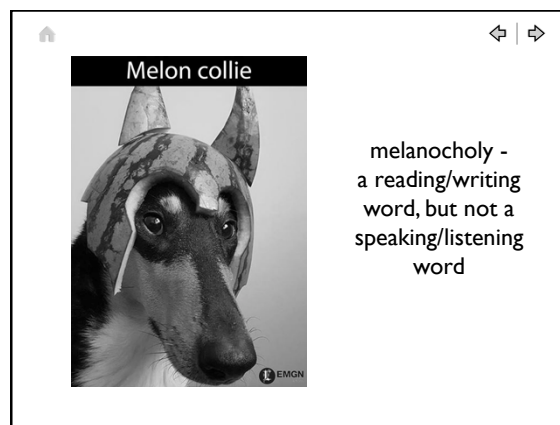
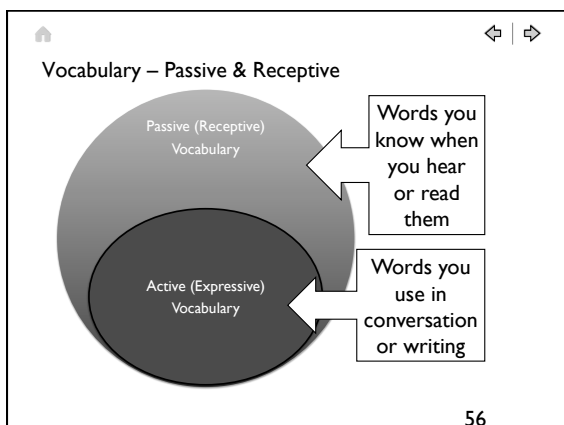
Activities to Build Sentence Level Writing

- | | |
|---------------------------|----------------------|
| ➤ Sentence parts matching | ➤ Sentence expanding |
| ➤ Sentence unscrambling | ➤ Sentence imitating |
| ➤ Sentence combining | ➤ Tandem writing |
| | ➤ Sentence writing |



Sentence Skills & Comprehension

- A growing body of research (Scott, 2009) indicates that comprehension is connected not just to vocabulary but also to syntax.
- A student must know 90-95% of words on a page to achieve comprehension (Nagy, 2000).
- That said, a text can also include only words a student knows, and, due to syntax, the student can still find the text incomprehensible.



- ### Vocabulary - Difficulties
- may know something is wrong but not be able to correct it (McCutchen, *Writing Research*)
 - difficulty finding alternative language (McCutchen, *Writing Research*)
 - to understand a piece of text, students must know the meanings of 90-95% of the words on the page

- ### Vocabulary – Missed Nuances
- Examples of nuance errors from a ninth grader's work:
- The funeral was full of solace after the coffin was buried into the ground.
 - I took a long strode to second base, so that I would not get out.
 - I have been told I have many droll personalities that no one has ever seen.

- ### Vocabulary – Multiple Exposures
- pioneer
segregation
parallel
- Beck, Kucan, and McKeown's book, *Bringing Words to Life*, is worth a look.

Vocabulary

➤ Morphology:

- endings that determine number, tense, part of speech
- word parts that determine (and can be applied to) meaning

Vocabulary - Morphology

prefix – changes meaning of base

base – core meaning in word

suffix – determines number, tense, part of speech

struct = to build

structure

instruct

construction

destruction

instructional

restructure

structural

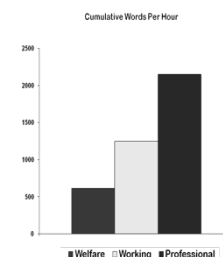
infrastructure

Vocabulary - Morphology

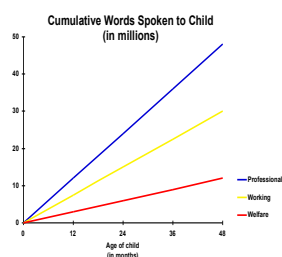
➤ Samples of morphological endings that determine number, tense, part of speech:

- dangerous (-ous indicates an adjective)
- bills (-s indicates a plural)
- landed (-ed indicates past tense)

Cumulative Language Experiences

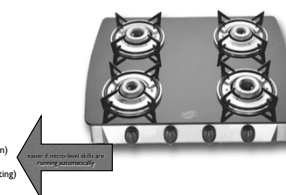


Cumulative Language Experiences



Elements of Written Language

- motor component
- spelling
- mechanics (used to cluster groups of words)
- syntax (arrangement of words to form sentences)
- vocabulary (words in a person's vocabulary)
- Oral language
- text structure (paragraph/essay construction)
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Text Structure: Research says...

- Outlining (both internally and externally) does benefit writing.
- Some rough drafting MAY benefit writing.
- Children (and particularly children with LD) create better texts when dictating but...
- Good writers frequently read over the preceding few sentences though this rarely involves modifying the text. Rather, it most likely decreases short term memory demands.

Text Structure: Research says...

- Children under the age of 10 spend little time planning.
 - When asked to plan, they usually draft.
 - Since the vast majority of their expression at this point is verbal, they may attempt to imitate verbal communication patterns when they write.
 - Children 10 and up plan more and do more conceptually.

Text Structure: Research says...

- Younger students don't plan a lot, and as a result may not recognize intended message.
- Younger students sometimes have difficulty differentiating between their interpretations and the actual text. Older students are better at this.

Text Structure: Research says...

- Children's written texts are typically shorter than those that are dictated. Brevity is a primary factor in determination that students do better dictating than writing.
- Challenged writers sometimes produce MORE text, MORE quickly.
 - lack vocabulary variety
 - lack working memory necessary to revise/edit

Text Structure

It's obvious that the writer must access *new* content to express. What may be less obvious is that she must also access the content she has *already* expressed.

If you're going to do that successfully, you don't have much short term memory left over.

Text Structure

- flow requires...
 - transitional language
 - word choice
- rules require...
 - knowledge of audience
 - knowledge of different kinds of writing

Text Structure

- Encourage/develop pre-planning, note taking, drafting as this activity decreases # of processes that must be juggled simultaneously.
- Encourage/develop jotting down ideas, creating diagrams, etc. as this may reduce working memory overload and free space for problem solving.
- Encourage development of knowledge about the topic prior to writing.

Prominent Concerns

- inability to focus on important information and suppress what is unimportant
- inability to ignore poor wording or spelling
- inability to prioritize memory over mechanics/structure
- inability to divide a task and sequence it

Recommendations

- Teacher education:
 - Teach the teacher the brain.
 - Teach the teacher direct, explicit, research-based techniques for improving writing.

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Recommended Resources

- Tools that Accompany the Writing Matters Approach by William Van Chave - Available at wvcd.com**
- Writer's Journal*. (several different styles for students at different grade levels, emphasizing quick and easy access to word lists and rules for sentence and essay construction)
- Grammar Dots*. (grammar/sentence generating dice activities)
- GrammarBuilder Concept Cards*. (concept cards including parts of speech and sentence parts for student and instructor use)
- Sentence Sense*. (workbook series for student practice in sentence skill development)
- Sentence-Splitter 1 to 6*. (sentence expansion card games)
- Sentence Templates and Writing Expansion posters*.
- Word of Word 1 to 6*. (grammar/sentence construction card games)
- Writing Skills Concept Charts*. (with co-author Heather Redenbach) (8.5x11 visuals for parts of speech and sentence parts)
- Writing Skills Series*. (grammar/sentence sorting activity packs)
- Tools that Complement the Writing Matters Approach by Other Authors - Published by wvcd.com**
- King, Diana. *Learning Curves: Elementary Level* (left & right-handed versions). (new curative workbooks for instructing elementary students)
- Other Useful Writing Tools at wvcd.com**
- King, Diana. *Curative Writing Skills* (left and right-handed versions). (remedial workbooks for older students who struggle with handwriting)
- King, Diana. *Keyboarding Skills*. (voluntary method of instructing students in keyboarding)
- King, Diana. *Learning Curves: Elementary Level* (left & right-handed versions). (new curative workbooks for instructing elementary students)
- King, Diana. *Writing Skills: Books A, C, E, Two, and Three*. (workbooks involving grammar and sentence and paragraph development)
- King, Diana. *Prose*. (1 covering Phrases and 1 covering Clauses)
- Padgett, Patricia. *Writing Adventure Books 1 to 2*. (workbooks involving sentence and paragraph writing)
- Pencil Grips. (assorted pencil grips to improve or correct pencil grasp)
- Tactile Surfaces for Writing. (Brain Freeze, Gelboard, and Smart Sand)
- Useful Student Books from Outside Sources**
- Schubert, Edgar. *Science History*. Levels A, B, and C. phoenixlearningresources.com. (workbooks - sentence combining skills)