Learning objectives

- Participants will be able to identify current writing perspectives and research on PK-12 writing development
- Participants will be able to describe recent research-based strategies linked to:
  - handwriting
  - keyboarding
  - spelling
  - composition

Cognitive processes

1. Planning
   - Generating ideas and setting goals

2. Text Production
   2a. Text generation
      - transcribing ideas into written text, sentence construction
   2b. Transcription
      - Handwriting, keyboarding, spelling, punctuation

3. Revising
   - Rereading the text to improve clarity of ideas

Perspectives on writing

Hayes and Flower's (1980); Berninger and Swanson (1994)
1990s: A focus on the cognitive demands of writing

* Research showed that young children must allocate more cognitive capacity to graphomotor processing, (e.g., handwriting and spelling skills). (Berninger, Vaughan, Abbott, Abbott, Brooks, Rogan, Reed & Graham, 1997)
* The mechanical demands of handwriting interfere with the higher order processing needed for composing. Graham and Weintraub (1996)
* Children who write or type slowly, cannot keep pace with the ideas and plans that they hold in their memory, which interferes with getting those ideas on paper.

Language Connections

* Research indicates that language abilities are significantly correlated with writing.
* Studies have shown that the number of words, as well as the sophistication of grammar or syntax, is generally higher in oral language as compared to written language in the early grades, but the difference declines with age (O'Donnell, Griffin, & Norris, 1967).

Language Connections

* For children with early oral language difficulties, the research shows that when oral language problems are resolved, written language issues may continue into adolescence (Naucler & Magnusson, 2002)
* These language connections speak to the role of SLsP to support writing

Writing Development
Emergent Literacy
Emergent Literacy

* Protowriting (pretend writing) is integrated into a young child's drawing as early as age 2.
* **Drawing is combined with protowriting** (scribbles and mock letters) when the pictures alone do not convey the child's intended meaning.
* As young as age two to three, children understand that writing and drawing are different.
* Brennemann, Massey, Machado & Gelman (1996) demonstrated that when young children draw, they make wide continuous movements, whereas when they write, they lift their writing instrument off the page more often.

Emergent Literacy

* Young children imitate the writing they see in their environment
* Young children incorporate writing into pretend play routines, and intentionally experiment with writing to convey meaning for different purposes within a social context (Chapin, 2006).
* Name writing, in particular, demonstrates the evolving understanding of:
  + Non-pictorality
  + Linearity
  + Variety
  + Multiplicity

(Lavine, 1972)
The Alphabetic Principal

* Over time they begin to comprehend the alphabetic principle that letters “say their names,” and that these phonetic elements can be combined to form words (i.e., inventive spelling).

* Around age four, children begin to understand that there is a one-to-one correspondence of speech to text. In literacy rich environments, when young children verbalize as they are writing, they demonstrate that writing is related to language and begin to understand the one-to-one correspondence of speech to text.
Verbal dictation to an adult is not a substitute.

Children must be actively engaged in writing in the developing years in order to force thought on letter-sound correspondence and the 1 to 1 correspondence of speech to text.

Adapted from Literacy's Beginnings by McGe and Richgels
**Handwriting**

Evidence-Based Instructional Handwriting Interventions
**Handwriting**

- Handwriting is formally introduced in kindergarten.
- By the end of 1st grade, students are expected to print all upper and lowercase letters legibly.
- Handwriting proficiency typically increases across grades one to three.
- By 4th grade, today's students are expected to be able to handwrite for longer periods.
- By the middle school, speed of production is more of an issue and students must balance speed with legibility as they write for extended periods of time.

**Grip and grasp patterns**

- Legibility varies depending upon the writing task (Graham, Struck, Santoro & Berninger, 2006).
- Pinch strength/fatigue contributes to legibility for longer writing tasks in young children with dysgraphia (Engel-Yeger & Rosenblum, 2010).
- Non-standard pencil grasp did not influence handwriting speed or legibility in 120 typical fourth graders (Schwellnus, Carnahan, Kushki, Polatajko, Missiuna, & Chau, 2012).

**What the current evidence tells us about instructional handwriting intervention**

- Manuscript is easier than cursive for young writers.
- Fine motor training influences letter formation, but not automaticity or fluency (accuracy + speed).
- Fluency of handwriting is key, whether it is manuscript, cursive or a combination.

**Effects of Direct OT**

- Case-Smith (2002) compared the effects of direct occupational therapy (mean of 16.4 sessions) for students ages 7 to 10 (n=29) to students with poor handwriting who did not receive O.T. services (n=9).
- Most OTs participating in the study reported the use of visual motor activities and handwriting practice.
- On average, students who received OT improved legibility by 14.2% compared to 5.8% for students who did not receive services. However, speed of handwriting did not improve.
After 24 lessons over four months with 144 1st graders, the combination of visual cues, plus writing letters from memory, plus composing were found to be more effective than copying and imitating adult modeling to improve handwriting legibility, automaticity and productivity. 

(Berninger et al., 1997)

Employed a handwriting instructional program with 19 first grade children with orthographic motor integration difficulties.

Individual and small group instruction was:
- red dot/green dot,
- rainbow letters,
- writing letters in the air,
- visual association strategies to facilitate memory of letter formations,
- charts to graph the speed of writing the alphabet.

After 7 months of instruction, there was no difference between the treatment group and the control group on measures of handwriting and written expression.

This handwriting intervention emphasized increasing the automaticity of letter formation rather than just copying activities.

Conducted a six-month study with 1st grade students with handwriting difficulties.

Thirty-eight children were identified as at-risk for handwriting problems, some with identified disabilities.

There were nine units focusing on three lower case letters per unit with similar formational characteristics (lit/oea/nsr/phf/cdg/bum/vvy/xkz/jq).

There were three 15-minute lessons per unit to total 27 lessons.
Instructional Handwriting Research (cont.)
Graham, Harris and Fink (2000)

* Students in the handwriting treatment group outperformed the students in the control group
* Handwriting instruction led to greater gains in compositional fluency when writing letters of the alphabet and when copying connected text, but not in overall story quality.
* The students worked towards mastery for naming and forming each letter with fluency before moving on the next unit of three new letters.
* Improvements were maintained after six months.

Classroom Instruction in the Primary Grades

Graham (2010) suggests that handwriting be taught in the primary grades (1st to 3rd) in short daily sessions, the equivalent of 10 to 20 minutes per day for a typical student.

Graham advocates for self-evaluation strategies by having slow handwriters set goals to increase fluency, directing them to copy a short passage legibly with more speed and having them chart their progress.

Instructional Handwriting Research (cont.)
Graham, Harris and Fink (2000)

* Each lesson had four activities:
  1. Alphabet Warm Up: naming, matching letters, letter sequences
  2. Alphabet Practice: letter naming with tracing or writing letters
  3. Alphabet Rockets: Focus on fluency, charting progress
  4. Alphabet Fun: Drawing and writing

Graphing to promote automaticity
Overall, what the current evidence tells us about instructional handwriting intervention

A combination of
* visual cues
* plus writing letters from memory
* plus composing
were found to be more effective than copying and imitating adult modeling to improve handwriting legibility, automaticity and productivity.

Summary: Handwriting interventions demonstrate:

* Direct handwriting practice is more effective than activities that isolate fine motor or visual motor skills.
* Activities that emphasize fluency enhance writing output more than just emphasis on letter formation.
* The use of visual cues, with an emphasis on memory and automaticity, is more effective than modeling and copying activities alone.
* Encouraging students to chart the progress of handwriting speed is an effective self-monitoring strategy.

Meaningful writing should accompany handwriting practice.

Technology for students with chronic difficulties with handwriting and/or spelling


Apps for letter formation
http://otswithapps.com/2014/03/25/ots-with-apps-manuscript-handwriting-app-feature-match/

**Topic: Manuscript Handwriting Apps for iOS**

<table>
<thead>
<tr>
<th>App Name</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Devices</td>
<td>Pad, Phone</td>
</tr>
<tr>
<td>Cost</td>
<td>Free</td>
</tr>
<tr>
<td>Data Collection</td>
<td>No, unitized data</td>
</tr>
<tr>
<td>Measures</td>
<td>Progress monitoring, letter recognition, letter formation</td>
</tr>
<tr>
<td>Ability to support accurate handwriting development</td>
<td></td>
</tr>
<tr>
<td>Ability to support progress monitoring in users</td>
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</tbody>
</table>

**Writing Wizard**

**Letter School**
Speech Recognition

Speech-to-Text

Assistive Technology: Speech Recognition

* For students with severe dysgraphia, severe dyslexia who consistently struggle to retrieve mental graphic representation (MGRs), or for those who make little progress after many years of spelling instruction, speech recognition can enable students to write more fluently.

* Students still need word recognition skills, the ability to cognitively multi-task, and understand the writing process to use SR effectively.

* However, speech to text tools are more ubiquitous and easier to use, and these easier tools can be used in earlier grades (e.g., Siri, Google Chrome Dictation)

Research across 3 conditions

* MacArthur and Cavalier (2004) examined three writing conditions:
  1. handwriting,
  2. dictation to an adult scribe
  3. dictation using Dragon Naturally Speaking with 31 students ages 15 to 16 with and without LD.

* Results showed that with SR:
  * 68% of all students achieved 85% accuracy
  * 40% of the students achieved 90% accuracy following roughly 2 hours of training,
  * Only three students produced less than 80% accuracy.

Research across 3 conditions (cont.)


* Both conditions resulted in better quality essays compared to handwriting.
* The best essays by students with LD were produced when dictating to an adult scribe.
* Essays written using SR by students with LD ranked second in quality, but were superior to handwritten essays.
Speech Recognition
Quinlan (2004)

Conducted a study with 41 fluent and less fluent writers (identified by their level of transcription difficulties) ages 11-14.
- The students wrote four narratives under four writing conditions: using handwriting, using SR, with advance planning, and without advance planning.
- Less fluent writers using SR to compose narratives produced significantly fewer errors and more words, compared to their handwritten products.
- Doesn’t guarantee quality of writing, however
- SR did not improve the fluency or accuracy for typical, fluent writers.

Speech Recognition
Voice Recognition Software Finally Beats Humans At Typing, Study Finds Heard on All Things Considered, (August 24, 2016, 8:00 AM ET)
- Study conducted with 32 humans ages 19-32
- Speech recognition was 3 times faster than typing text messages
- Error rate in English was 20% lower than typing on a keyboard.

Dragon Naturally Speaking

Speak Q
Chrome apps

Dictation
* https://dictation.io/

VoiceNote II
* https://voicenote.in/

Apple Dictation

Using Dictation in an app
You can speak the text you want to enter in a text field, like a TextEdit or Pages document.

Need to be able to read to edit your work.

Use these steps to start dictating:
1. Click a text field or document window where you want to start typing.
2. Press the fn (Function) key twice, or choose Edit > Start Dictation.
3. Dictate (speak) what you want your Mac to type.
4. When finished, click Done or press the fn key again. Your spoken words then appear in the text field.

iPhone Dictation

Open a text message or email window or a note window
Click on the mic
Start speaking
Click Done to stop

Turn Siri/dictation on in Settings > General

bit.ly/srguide

Speech Recognition as AT for Writing (2014)
By Dan Cochrane & Kelly Key
Keyboarding
Evidence-Based Instructional
Keyboarding Interventions

Audience poll (chat box)
What is the predominant approach keyboarding instruction at your school(s) or district?
1. Formal keyboarding instruction begins in elementary grades
2. Formal keyboarding is introduced in secondary grades
3. No specific policy on when keyboarding should be introduced

Perspectives on Keyboarding Instruction

There is no clear answer on what form of keyboarding is needed for generative typing when composing directly on the computer (Cooper, 1983).

Shuller (1989) referred to three levels of keyboarding skills:
1) hunt and peck,
2) hunt and peck with less hunting, and
3) the touch method.

3 Stages of Motor Learning for Keyboarding

Crews, North and Erthal (2006) describe three stages of motor learning for keyboarding:

1. The cognitive phase when keystrokes and ergonomics are introduced
2. the associative stimulus phase when practice exercises facilitate “kinesthetic memory traces,”
3. the autonomous muscle response phase, when the individual is able to complete keyboarded writing tasks without thinking about finger movements
Approaches to Touch-Typing

Nichols (1995) provided students in 3rd to 6th grades weekly keyboarding instruction for a full school year using two different methods:
1. Teacher-directed alphabetic approach (Diana King Method) [link to Diana King Method]
2. Software-directed home keys approach (Type to Learn software).

* Instruction was completed in 12 weeks using the teacher-directed approach, but took 21 weeks using the software approach.

<table>
<thead>
<tr>
<th>Grade</th>
<th>Alphabetic Approach WPM</th>
<th>Software Approach WPM</th>
</tr>
</thead>
<tbody>
<tr>
<td>3rd</td>
<td>5.1</td>
<td>6.4</td>
</tr>
<tr>
<td>4th</td>
<td>6.5</td>
<td>7.8</td>
</tr>
<tr>
<td>5th</td>
<td>8.4</td>
<td>9.8</td>
</tr>
</tbody>
</table>

Allocation Of Instructional Time

Freeman, et al.'s (2005) literature review on keyboarding reports that:
* the number of hours of keyboarding instruction ranged from 5 to 30 hours,
* the frequency ranged from 2 to 5 sessions per week,
* and the length of sessions ranged from 20 to 45 minutes.
* Investigations often reported 25 to 30 hours as optimal.
* Most suggestions are based on survey data and opinion.

Instructional Concerns

* Sufficient generative writing time using the computer to maintain keyboarding speeds was also a concern (Rogers, Laehn, Lang, O’Leary, & Sommers, 2003; Zeitz, 2008).
* Keyboarding software was preferred, as most teachers did not have formal training in keyboarding instruction.
* Formal keyboarding instruction needs to be structured, consistent and sequential to reach a level of automaticity.

Keyboarding as an Accommodation

* Regularly monitor handwriting and keyboarding to look for trends in student development using comparative data.
* If handwriting continues to be arduous, but keyboarding baselines are increasing, then it may be an opportune time for structured keyboarding instruction.
Keyboarding as an Accommodation

If handwriting is illegible in the primary years, keyboarding (hunt and peck to build familiarity) should be used in parallel as an accommodation so that young students can actively engage in literacy learning to develop spelling and composing skills.

Keyboarding as an Accommodation

For older middle and high school students, when neither handwriting nor keyboarding automaticity is achieved after explicit instruction and practice, and/or when severe spelling deficits often associated with dyslexia persist, speech recognition is a form of transcription that should be evaluated.

Keyboarding programs
apps, websites and software

Big Brown Bear Website
http://bigbrownbear.co.uk/learntotype/

* Free
* Touch typing-home row keys approach
* Provides % of accuracy
* Elementary level
* Auditory keystroke feedback
Dance Mat Typing
http://www.bbc.co.uk/guides/z3c6tfr
* Free website
* Ages 7-11
* Animated characters-British accent
* Feedback when press wrong key

Typing Club App
https://s.typingclub.com/schools.html
Free app
iPAD, Chrome
Tracks progress
Calculates WPM
Upper ES to HS

Typing Lessons Chrome App- free
MS, HS touch typing lessons
Unlimited school edition- Free: 3 classes, 2 instructors, data stored 30 days
Premium- around $2.00 per student, no ads, district level management
Type to Learn

Purchase for Mac or PC

Individual pricing

Software or Web enabled version

Futuristic game

Over 100 lessons and activities

Remediation lessons

Accessibility options, blind, VI, hearing impaired, ELL

Resources

OTs with apps

* www.otswithapps.com


Key Points

* Writing using word prediction demands a multi-disciplinary approach to assessment and a trans-disciplinary approach to instruction.

* Integrate handwriting and keyboarding into literacy activities. Don't expect teachers to work on handwriting or keyboarding in isolation.

* It's not about how many sessions of handwriting or keyboarding practice. It's about the degree to which handwriting / keyboarding can be incorporated into classroom literacy learning routines.
Outreach

- Targeted outreach is needed to provide leadership on keyboarding issues:
  - To help educators and administrators understand the impact of transcription speed on performance
  - To create appropriate policy and procedures on:
    - Importance of keyboarding instruction (when, how)
    - Effect of writing modalities on high stakes testing.
  - Technology-based strategies that support writing

What is most important, to the extent possible, is that students have some form of fluent transcription in order to reduce the cognitive load and allow for the development of higher-level writing skills.

Graham (2010)

Current Perspectives on Spelling

While reading involves “decoding,” spelling involves “encoding.”

Persistence of Spelling Deficits

- Poor spellers may demonstrate a wide variety of developmental patterns because they attempt to rely on visual memory in the absence of well-developed phonological processing (Khami and Hinton, 2000)
- Some students who cannot retain MGRs over rely on phonics and spell words based on the sounds within the words.
- Older students with dyslexia made progress similar to that of younger students, but that for some students, the spelling hurdles proved difficult to overcome. (Cassar et al., 2005)
Long term spelling deficits

* Research indicates that poor spellers in the intermediate and middle school grades continue to demonstrate difficulties with orthographic knowledge and that the gap between reading and spelling can widen over time (Moats, Foorman & Taylor, 2006; Cassar, Treiman, Moats, Pollo and Kessler (2005).

* Spelling deficits can be long term requiring individualized instruction supplemented by accommodations.

Persistent Spelling Difficulties

On the Isle of Wight, a 30 year follow-up study was conducted with individuals initially identified, at ages 14 and 15, to have significant reading disabilities and spelling deficits (Maughan, et al., 2009).

* Poor readers’ spelling abilities continued to be impaired at ages 44 and 45.

* Eighty percent of the adults with poor reading perceived themselves as poor spellers who experienced difficulty writing a letter.

* These individuals, with reading skills delayed more than 28 months when tested in adolescence, were more likely to have:
  * Left school or have completed their education earlier than the control group,
  * Were more likely to have jobs with less literacy demands.

Linguistic Knowledge

* Linguistic knowledge addresses:
  * phonological awareness (sounds within words)
  * orthography (patterns of letters within words)
  * morphology (i.e., suffixes, prefixes, base words, and word roots)
  * mental orthographic representations (MGRs) (words stored in an individual's long-term memory after repeated exposure to them in print.)
  * vocabulary (word meaning)

An individual's misspellings are a “window” to underlying linguistic deficits. The analysis of a carefully collected sample of his or her spelling errors can be used to identify which linguistic deficits are interfering with that student’s reading and spelling.
The input of speech language pathologists trained in linguistics may be particularly helpful to classroom teachers seeking assistance translating linguistic-based spelling assessment data in an effort to adjust instruction.

DeCoste/2018

**SLPs**

While teachers group children for reading instruction, this is not the case as often for spelling instruction.

Morris, et al. (1995) suggested that this may be a management issue in that teachers are provided single grade-level spelling books and use whole class instruction which implies that one-size-fits-all.

DeCoste/2018

Explicit spelling instruction is needed

There was an assumption that spelling would develop as a result of good phonological and reading instruction. The results of a longitudinal, large-scale indicated that reading achievement can remain steady while spelling declines (Mehta, Foorman, Branum-Martin and Taylor, 2005).

These results suggest that explicit spelling instruction is necessary.

DeCoste/2018

Research: Traditional vs. Multi-linguistic Instruction

Apel, Masterson, and Hart (2004a) conducted traditional spelling instruction in one 3rd grade classroom, while another 3rd grade classroom received multi-linguistic spelling instruction.

Classrooms had similar racial and linguistic backgrounds, as well the number of students receiving special services.

Based on a list of 40 words, the results indicated that after nine weeks of instruction, the multi-linguistic approach demonstrated improvements with a medium effect size while the traditional approach showed no improvement.

DeCoste/2018
Classroom Spelling Practices

* The Friday “whole class” spelling test approach to teaching spelling continues to be more predominant than spelling instruction that is tailored to individualized development.
* In a national survey, Graham, et al. (2008), found that 90% of 1st to 3rd grade teachers reported using the Friday test approach to teaching spelling.
* Graham, et al. assert that the typical “approach to word selection and instruction does not align with current understanding of the many linguistic strategies that can be used to spell words” (p. 186).

Morris et. al (1995) studied the spelling performance of four 3rd grade classrooms and found that although these students performed well on the end-of-the-week spelling test, long-term retention and understanding of spelling pattern knowledge was delayed compared to their peers.

The authors suggest that the weekly spelling task masked their lack of linguistic knowledge.

Comparative percentage of correct spellings) of 3rd grade students (Morris, Blanton, Blanton, Nowacek and Perney, 1995)

<table>
<thead>
<tr>
<th></th>
<th>High Spelling Group</th>
<th>Low Spelling Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest</td>
<td>55%</td>
<td>13%</td>
</tr>
<tr>
<td>Weekly Test</td>
<td>96%</td>
<td>83%</td>
</tr>
<tr>
<td>6 Week Review Test</td>
<td>85%</td>
<td>49%</td>
</tr>
<tr>
<td>End of Year Posttest</td>
<td>86%</td>
<td>46%</td>
</tr>
</tbody>
</table>

Instructional Trends Today

* The instructional trend today is to assess the level of spelling development of students, and to teach pattern generalization at the student's instructional level (Schlagal, 2013).
* Targeted word lists should be based on an assessment of the student’s instructional level of word knowledge.
* Spelling posttest results should be used to help teachers make informed decisions on subsequent words lists.
* Time will also need to be directed toward developing mental images of irregular high frequency words (e.g., said, aunt, come, know, friend), as well as to word meaning relative to spelling homonyms (e.g., pair/ pear; some/sum).
Spelling Strategies

While there is less research on spelling compared to reading, there is principle convergence on the following spelling strategies:

* Multisensory methods (visual, auditory, tactile)
* Instruction emphasizing patterns in language (phoneme-grapheme, within word patterns, syllable patterns, morphological patterns)
* Limiting the number of non-pattern (irregular) words taught at any one time, and provide corrective feedback on these words
* Systematic and explicit spelling instruction, leading to generalization to independent writing

Moats (2010)

Spelling Instruction Strategies

To improve phonological knowledge:

Using beads on a string or tokens (Apel, Masterson, & Brimo, 2012)

* The child listens to a dictated word. He then moves the beads or places tokens to represent each phoneme in the word.
* The child then writes at least one letter per token on paper or on an erasable white board.

Spelling Instruction Strategies (cont.)

Thereafter, the child reads his word.

* Example: “school” would be represented by four blocks to represent the four phonemes /s/k/oo/l/. The child might write “scol” or “skul” demonstrating that he is able to represent all the sounds in the word.
* The objective at this level is not on conventional spelling, but on discerning phonemes within a word. (Apel, Masterson, & Brimo, 2012)

Spelling Instruction Strategies

* To improve orthographic knowledge

* Students have a limited set of tag board letters arranged in pocket folder. They use these letters to make words.
* For example, a student might have the letters, e, i, n, w, p, s.
* With these letters the student is instructed to make the word in. Then:
* in > win > pin > spin > spine

Making Words Series
by Cunningham and Hall (2008a, 2008b)
To improve orthographic knowledge:
* Children can look in stories and poems for words of the same pattern.
* Using letter tiles, they can change letters (e.g., a single consonant, or blend or digraph) at the beginning or end of the word to make new words (e.g., bake>make>made>shade).
* The authors have created word sorting manuals to help teachers provide instruction at all levels of linguistic knowledge, from elementary to high school.

_Words Their Way_ by Bear, Invernizzi, Templeton and Johnston (2011)

To improve morphological knowledge:

Word Relatives strategy
* The teacher first discusses the word “relatives” and how relatives resemble one another even if they do not look or sound alike. This analogy is applied to words that are morphologically related.
* The teacher then introduces a base word and asks the student to generate related words (e.g., enjoy> enjoyment, enjoyable, or compare> comparison, comparative, comparable).
* This activity is meant to help students understand word derivations and successfully use strategies to correctly spell these words.


To reinforce MGR’s of irregular words

Explicit instruction on irregular words is needed.
* Irregular, high frequency words should be taught a few at a time and practiced until mastered.
* “Look-say-cover-write-check” is an effective study strategy for irregular words (Schlagal, 2013).
* Once irregular words are learned, they can be put in a box for periodic review.
* Previously learned words can be intermixed with new words as a way to reinforce spelling abilities.
* Students can also create personal spelling dictionaries organized alphabetically that include words that are used frequently, but are difficult to spell.

Spelling instruction combined with handwriting

Handwriting and spelling deficits often co-occur.

Graham and Harris (2006) merged handwriting and spelling instruction with first graders and research results showed greater gains in spelling, handwriting legibility and fluency, as well as with sentence writing and vocabulary.
* Phonics warm up (2 minutes): Identifying letter sounds in words
* Letter formation practice (5 minutes): (Using two letters that are difficult for him or her to form correctly based on a pretest): tracing copying
* Word building (4 minutes; 2 rimes per unit): The student builds words using consonants, blends or digraphs (cat, fat, flat, that) using letter tiles
Spelling instruction combined with handwriting (cont.)

- **Word study (4 minutes):** The student practices spelling five high frequency words written on index cards that he or she spelled incorrectly on a high frequency word pretest. The student says the word and the letters, writes the word from memory, checks the spelling, and makes corrections.

- **Writing (5 minutes):** The student is prompted to write a narrative with the words used during Word Building.

- **Word Sorts:** The student sorts words written on index cards with the word patterns learned and writes new words that fit the pattern, or search for words that use this pattern.

  Graham and Harris (2006)

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Transdisciplinary Approaches

**SLPs**

- The spelling activities described can be done in small groups in the classroom, providing the students are at similar levels of spelling development, working on similar word patterns.

- As a supplemental service, speech language pathologists can incorporate these multi-linguistic activities into therapy settings, or model this in the classroom.

**OTs**

- Occupational therapists serving students in classrooms should collaborate with teachers to identify what word patterns the student is learning and integrate handwriting instruction into a more multi-linguistic approach to word spelling and writing.

  - Example: “Making words” plus “Share the pen”

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Technology Supporting Spelling

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Research: Word Processing with Spell Checking

- The spell checker feature in word processing software is the most commonly used word processing tool (MacArthur, 1999).

- The benefits of spell checkers for 106 students with learning disabilities in grades 4-12 were demonstrated in a study by Lewis, Ashton, Haapa, Kieley and Fielden, 2000).
Research: Word Processing with Spell Checking

MacArthur, Graham, Haynes & De La Paz (1996) examined the effects of spell checkers on 27 students with learning disabilities in grades 6 to 8.

- They found that without a spell checker, students corrected 9% of their spelling errors.
- They increased their spelling error correction rate to 37% with the use of a spell checker.
- The researchers also found that spell checkers have their limitations. They determined that on average, the computer was able to suggest the correct spelling only 55% of the time.
- Of these correct spellings suggestions, students in this study were able to select the correct word 82% of the time.

Can’t spell that big word...
The big word finder
The mountain of snow on the side of the road was big

Using Siri to speak the word  you are trying to spell

Must be able to recognize the intended word.

Word Prediction
On computers, word prediction programs (e.g., CoWriter, Word Q) are typically floating applications that are used in conjunction with word processors, web browsers, social media, and email to predict the word the student is attempting to write based on initial letter combinations.

- These programs are designed to be flexible enough to make spelling suggestions based on phonetic spellings (anamiz/animals; lftnt/elephant).

Good word prediction applications can:
- learn words you use more often.
- speak suggested words, and can make linguistic predictions to spell words (e.g., homonyms) based on the context of word in the sentence (e.g., CoWriter, Word Q, Ginger, Ghotit).

MacArthur (1999) cautions that mastering word prediction can be a challenge for students with working memory, attention and executive function issues because of the need to continually monitor the list of spelling options which changes with each letter typed. And though word prediction may improve the quality of text, it is also a slower mode of text entry.

Lewis, Graves, Ashton & Kieley (1998) found that
- Students using word prediction increased their spelling accuracy, but were able to achieve 81% of their handwriting speed.
- Students using word prediction with text to speech to read the spelling options, reached only 41% of their handwriting speed, but reduced their spelling errors by half.

Accuracy vs. speed trade-off
Handley-More, Deitz, Billingsley and Coggins’ (2003) results indicated greater writing improvement for word processing-with-word prediction, as compared to handwriting, and word processing-without-word prediction for 4th and 5th grade LD students.

* No improvement was found in the speed of writing.

Another study used three types of word prediction programs (Word Q, CoWriter and WriteAssist). Overall, students increased their spelling accuracy from 58% to 96% across all programs.

(Evmenova, Graff, Jerome and Behrmann, 2010).

CoWriter Universal
Web-based word prediction: Huge dictionary
www.donjohnston.com

https://sites.google.com/a/nssed.org/supporting-learners-in-chrome/writing-tasks
Lynda S. Hartman Rev. 11/3/14 lhartman@nssed.org

* CoWriter is available for iPad, iPhone, Chromebook, or Windows/Mac laptops or desktop computers FOR ONE PRICE!
Writing apps and extensions to support spelling and writing

<table>
<thead>
<tr>
<th>Writing apps and extensions to support spelling and writing</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Google Voice Search</strong></td>
</tr>
<tr>
<td>* Free Google Chrome Browser</td>
</tr>
<tr>
<td>* Works in Gmail, Facebook and other web pages</td>
</tr>
<tr>
<td>* Does NOT work in Google Docs</td>
</tr>
<tr>
<td>* Can enter text in email, edit and then paste into a Google Doc?</td>
</tr>
</tbody>
</table>

Lynda S. Hartman
Rev. 11/3/14
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**Grammarly Lite - Smart Spellchecker**
Free, Premium Extension

**Spell and Grammar Checker by Ginger**
Free, Premium Chrome Extension
Need to register

Extensions to support writing and spelling
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**Computer Assisted Instruction for Spelling**

- * SPELL-Links to Reading and Writing by Learning By Design, Inc. (available at http://donjohnston.com)
- * Word Maker (http://donjohnston.com)
- * Simon SIO (http://donjohnston.com)
Spelling is but one component of writing instruction.

“The worst outcome occurs when students so restrict their writing, due to low spelling ability and confidence, that their teachers never know the richness of their thoughts, and the students never discover the sense of accomplishment that comes through writings one’s thoughts well” (Bailet, 2004, p. 675).

Summary

- Understand the student's level of reading and phonological development as this is key to fluent writing
- Incorporate spelling into therapeutic handwriting activities at the student’s level of phonological ability
- Handwriting into spelling activities in the classroom
- Encourage inventive spelling when students are at early stages of phonetic development

Evidence-Based Writing Strategies

<table>
<thead>
<tr>
<th>Strategies</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong positive effect sizes (r&gt;0.80)</td>
<td>- Writing strategies to explicitly teach planning, revising and editing of compositions (82)</td>
</tr>
<tr>
<td></td>
<td>- Summarization strategies (82)</td>
</tr>
<tr>
<td></td>
<td>- Self-Regulated Strategy Development (SRSD) (De La Paz &amp; Graham, 2002)</td>
</tr>
<tr>
<td></td>
<td>- Teaching and progressively fading summarization strategies</td>
</tr>
<tr>
<td>Moderately positive effect sizes (r&gt;0.50)</td>
<td>- Collaborative Writing</td>
</tr>
<tr>
<td></td>
<td>- Setting product goals</td>
</tr>
<tr>
<td></td>
<td>- Word Processing</td>
</tr>
<tr>
<td></td>
<td>- Sentence Combining</td>
</tr>
<tr>
<td></td>
<td>- Students work together to plan, draft, revise and edit compositions</td>
</tr>
<tr>
<td></td>
<td>- Teachers establish writing goals and benchmarks to produce different types of writing</td>
</tr>
<tr>
<td></td>
<td>- Use of word processing software, including spell checkers</td>
</tr>
<tr>
<td></td>
<td>- Alternate approach to grammar instruction to create more complex sentences</td>
</tr>
</tbody>
</table>
Evidence-Based Writing Strategies (cont.)

Mildly positive effect sizes (≤0.20)

- Pre-writing strategies
- Inquiry Activities
- Process writing approaches (≥2)
- Study of models (≥2)
- Writing for content area learning (≥2)

- Visual representations (concept maps, graphic organizers), brainstorming, group planning, reading materials to stimulate ideas
- Engaging students in activities that will develop content for specific writing tasks (e.g., data review, interviews, hands-on activities, dramatization)
- A framework for writing that includes goal setting, defining audience, using resources to plan, draft and revise
- Students analyze models of good writing across different types of writing
- Writing as a tool to summarize, analyze, interpret, explain, comment, or elaborate on academic topics

Strategies for Beginning Writers
Spandel (2012)

In the DWP e-book
Olinghouse and Wilson (2010)

Cognitive Processing: Planning

Young writers:

- do little conceptual planning prior to putting pencil to paper (Flower & Hayes, 1980).
- Young children start writing within one minute of obtaining a writing assignment, and they often speak aloud the words they write down (Bereiter & Scardamalia, 1987).
- Writing in the primary grades is characterized by “knowledge telling” (Bereiter & Scardamalia, 1987).
Cognitive Processing: Planning

Primary Grade Students:
* In the primary grades (K-2), children talk during writing about the mechanics of writing (e.g., letter formation, spelling, word meaning) and talk about their ideas (Chapman, 2006).
* As they gain experience, they begin to plan more and talk before and during writing lessens (Cioffi, 1984; McGillivray, 1994).
* Scott (2012) states that “energies devoted to transcription are thought to interfere with planning efforts” (p. 259) and that it is not a coincidence that the ability to plan improves when transcription is more fluent and automatic.

Intermediate Years (grades 3-5)
* Typically, fluent transcription is demonstrated by 4th grade, allowing for longer written texts.
* In the intermediate grades (3rd to 5th grades), children appear to focus more on meaning and linking ideas, and they are better able to plan, connect ideas, monitor, review, and revise to clarify meaning (Langer, 1986).

Intermediate Years (grades 3-5)
* At age 10, planning and content generation are still interwoven as students tend to think and write at the same time, and their notes on what to write typically include full sentences that they incorporate into their drafts (Strickland and Townsend, 2011).
* Scardamalia and Bereiter (1986) demonstrated that 10 year olds (around 5th grade) planned their writing using complete sentences and incorporated them into their drafts.
* By age 10, children can view their writing through the “eyes of the reader” (Strickland and Townsend, 2011).

Middle school students:
* By ages 12 and 14, planning is more distinct from writing and they can list ideas, which they later incorporate into text (Strickland and Townsend, 2011).
Cognitive Processing: Planning

Middle school students:

* Scardamalia and Bereiter (1986) By age 14 (around grade 8), students generated lists of ideas that they then expanded in their written text and planned more with audience and purpose in mind.

* The number of ideas generated during prewriting planning periods doubled between the ages of 10 to 13 (Scardamalia and Bereiter, 1986)

* Planning is more than just prewriting; it is part of the recursive writing process

Planning Strategies
(adapted from Lassonde and Richards, 2013)

<table>
<thead>
<tr>
<th>Strategies</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teacher think-alouds</td>
<td>The teacher models the use of planning strategies</td>
</tr>
<tr>
<td>Thinking time</td>
<td>Providing uninterrupted time for students to think about a writing task</td>
</tr>
<tr>
<td>Inquiry</td>
<td>Students write down questions about main questions and subordinate questions about their topic. Use sources or interviews to seek additional information.</td>
</tr>
<tr>
<td>Journals</td>
<td>Students sketch or write about their topic</td>
</tr>
<tr>
<td>Graphic organizers</td>
<td>Visual representations in the form of concept maps, charts, timelines. Paper-based or digital graphic organizers</td>
</tr>
<tr>
<td>Quick writes</td>
<td>Free writing without concern for spelling or punctuation to generate ideas</td>
</tr>
<tr>
<td>Dictating</td>
<td>Dictating ideas into a tape recorder, digital recorder, or use speech to text on a mobile device</td>
</tr>
<tr>
<td>Note cards</td>
<td>Write ideas on separate cards or use electronic note-taking tools to generate and organize ideas; Cornell note-taking</td>
</tr>
<tr>
<td>Outlining</td>
<td>Paper-based or word processing outlining tools</td>
</tr>
</tbody>
</table>

Cognitive Processing: Revising

Primary Grades K-3

* Children in the primary grades revise less than those in intermediate grades.

* At the second grade level, children can revise for surface (e.g., mechanics) and semantic errors (Cameron, Edmunds, Wigmore, Hunt & Linton, 1997) for small amounts of text.

* Third graders with teacher support can revise more at the word, sentence and paragraph level (Nistler, 1990).

Intermediate Grades 3-5

* Older elementary students are more capable of evaluating their writing and can better revise their work (McCormick, Busching, and Potter, 1992). Whereas younger elementary students focus more on spelling and other surface changes, older elementary students reflect more on content (Lin, Monroe, & Troia, 2007)

* Fourth graders are able to use peer discussion to help them revise for content and clarity (Dahl, 1998).

* By 6th grade, peer feedback is more likely to result in better quality revisions, and therefore, better quality writing (Olson, 1990).
Cognitive Processing: Revising

More often, children and even some adults use a revision schema that focuses more on the surface features of text, rather than conceptual features, but with age and the maturation of writing skills, they increase their ability to revise for meaning (Chanquoy, 2001; Faigley & Witte, 1981).

Less-skilled writers use a sentence-by-sentence approach, whereas skilled writers are able to examine the broader meaning of the full text (McCutchen, Francis, & Kerr, 1997).

Revision is an essential aspect of the writing process. Like planning and text generation, revision increases with age and experience.

Secondary levels

Proficient writers revise frequently during writing. Fitzgerald (1987)

Revising requires reading comprehension in that students must read effectively to detect needed changes (Hayes, 2004)

Skilled writers must be able to distance themselves from the writing in order to evaluate the text. They need metacognitive and self-regulation skills to critically evaluate and revise text (MacArthur, 2013).

Students with learning issues often struggle with these skills and as such tend only to manage surface edits at a sentence level (De La Paz, Swanson & Graham, 1998).

Four stages for instruction on Revising

(adapted from Moore et. al, 2011).

<table>
<thead>
<tr>
<th>Revision Stages</th>
<th>Instructional Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adding</td>
<td>Instruction on how to add words or phrases</td>
</tr>
<tr>
<td>Replacing</td>
<td>Replace boring or overused words</td>
</tr>
<tr>
<td>Reordering</td>
<td>Teach sequencing</td>
</tr>
<tr>
<td>Removing</td>
<td>Teach students to remove sentences or paragraphs that are not on topic or are distracting</td>
</tr>
</tbody>
</table>

Conferencing Suggestions
(adapted from Fountas & Pinell, 2001).

Writing conferences may involve:

- Listening to the student read his/her writing
- Determining the kind of help the student wants
- Praising the writer’s skills
- Discussing specific aspects of the writing
- Setting writing goals

Language to use during writing conferences:

- How is your writing coming along?
- How can I help you?
- What do you think about your writing draft?
- Tell me more about……
- What might you add to your writing?
- Did you remember to……?
- What will you be working on next?
Writing Instruction for Students with Disabilities

Graham and Harris (1997) state that to improve their writing, students with writing difficulties must attend to planning, authoring and revising text for 45 minutes per day, and that teachers need to provide explicit feedback along the way.

Students with LD

Schumaker and Deshler (2009) caution that students with LD must have sufficient opportunities to reach mastery for individual skills, and require individualized feedback when practicing new skills.

Schumaker and Deshler (2009) decry the tutoring approach to students with LD commonly seen in secondary settings. More often this approach tends to support the completion of assignments and provide consultation to classroom teachers, but is less likely to provide the comprehensive, research-based instructional conditions that students with LD require.

Self-Regulation Strategies

* Self-Regulated Strategy Development (SRSD) refers to an instructional framework designed to help students set writing goals and manage writing tasks, as well as increase motivation and independence.
* SRSD stages do not reflect a scripted linear approach, but a recursive approach that can be “reordered, combined, revisited, modified, or deleted, based on student’s needs” (Graham & Harris, 2009, p. 63).
* Most importantly, students move at their own pace, but mastery is essential before moving on to the next stage of SRSD.
* The SRSD framework has been used successfully with students at elementary and secondary levels.

Self-Regulation Strategies: A framework for Instruction (Graham & Harris, 2005)

<table>
<thead>
<tr>
<th>SRSD Stages</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Develop background knowledge</td>
<td>The teacher assesses the student’s level of knowledge for the skill to be taught and introduces the new strategy.</td>
</tr>
<tr>
<td>Discuss it</td>
<td>The teacher discusses the benefits of the new strategy and helps students understand how the strategy will be beneficial. The student commits to using a new strategy.</td>
</tr>
<tr>
<td>Model it</td>
<td>The teacher models the new strategy using a think-aloud.</td>
</tr>
<tr>
<td>Memorize it</td>
<td>The student memorizes the mnemonic for the strategy.</td>
</tr>
<tr>
<td>Support it</td>
<td>Guided practice is used to helps students gain mastery of the strategy.</td>
</tr>
<tr>
<td>Independent performance</td>
<td>The student is able to use the strategy to independently compose.</td>
</tr>
</tbody>
</table>
Explicit Strategies Within The SRSD Framework

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Steps</th>
<th>Purpose</th>
</tr>
</thead>
</table>
| POW      | Pick idea  
Organize notes  
Write and say more | Writing strategy for 2nd and 3rd grade writers |
| PLEASE   | Pick topic  
List ideas  
Evaluate list, sequence and organize  
Activate topic sentence  
Supply sentences  
End with a concluding sentence | Paragraph writing strategy |
| PLANS    | Pick goals  
List ways to meet goals  
And make notes and sequence notes  
Write and say more  
Check goals | Goal setting strategy |

Self-Regulation Strategies

- Self-regulation strategy instruction supports the complex, cognitive processes of writing.
- Self-regulation strategies were designed for students with learning and behavioral issues. However, research consistently demonstrates the benefits for all students. (Englert et al., 1991; Graham 2006)
- The SRSD framework is beneficial for at-risk writers as young as 2nd grade on up through high school.
- Based on the research, SRSD is effective for typical students, as well as students with learning disabilities, attention deficits, behavioral disorders or Asperger’s Syndrome.
- SRSD instruction is premature for students who struggle to write even one to two sentences.

Sentence Construction

* Direct instruction on sentence construction appears to have a positive influence on the writing of students with disabilities.

* In 2012, Datchuk and Kubina specifically examined peer-reviewed instructional research on the sentence-level writing of students with writing deficits and found positive effects.
Sentence Construction

Saddler (2012), in the Teacher’s Guide to Effective Sentence Writing:

* Emphasizes that the goal of sentence-building instruction is not to write longer sentences, but to learn to write better sentences.

* Progressing from writing at the sentence level, to the paragraph level, and then to the multi-paragraph level.

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### Examples of sentence construction exercises in the e-book (Saddler, 2012)

<table>
<thead>
<tr>
<th>Topics of Instruction</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sentence Basics</strong></td>
<td></td>
</tr>
</tbody>
</table>
| What is (and is not) a sentence | One or more complete thoughts. The leaves were falling vs. The leaves.
| Noun verb sentences  | The cat nipped. |
| Expanded noun-verb sentences | The cat nipped on the couch. |
| **Sentence Combining** |          |
| Compound structures with connectors: and, for, nor, yet, so, but, or | (Mary walked to town. Jose walked to town. Mary and Jose walked to town. They could travel by bus. They could travel by car.) They could travel by bus or car.
| Adverb structures | I ran home. I ran quickly. I quickly ran home. (We walked to the movies. We went after dinner.) We walked to the movies after dinner. (Josh took a summer class. He is learning algebra.) (Josh) Josh took a summer class to learn algebra. |
| Noun modifiers | The flowers were purple. They were blooming. I saw a big cat. It was black. I saw a big black cat. Robert played on the basketball team. He lived next door. (When) Robert who lived next door played on the basketball team. (The dog barked loudly. The dog’s name was Rex.) The dog barking loudly was named Rex. |

---

### Cross-disciplinary interventions

<table>
<thead>
<tr>
<th>Cross-disciplinary interventions</th>
<th>Shonda</th>
<th>Jose</th>
<th>Susan</th>
</tr>
</thead>
<tbody>
<tr>
<td>Handwriting</td>
<td>Emphasis on letters with curves S, C, e, f,</td>
<td>Emphasis on letters with diagonals V, K, M, N, R, W, Y</td>
<td>Ball/stick combinations a, b, d, h, p</td>
</tr>
<tr>
<td>Linguistics</td>
<td>High frequency MGRs, Making words: cvc, cvcc, ccac</td>
<td>Vocabulary, homonyms</td>
<td>Phonics: Focus on initial, medial and final consonant sounds</td>
</tr>
<tr>
<td>Keyboarding</td>
<td>Home row keyboarding, 5 min. warm up before daily writing</td>
<td>Home row keyboarding, 10 min. lesson before daily writing</td>
<td>Keyboarding familiarity for meaningful composing activities</td>
</tr>
<tr>
<td>Composing</td>
<td>Complete sentences With adj. and adv. word choice</td>
<td>Combining sentences, Sentence fluency</td>
<td>Basic sentences with inventive spelling encouraged; Generating ideas</td>
</tr>
<tr>
<td>Technology</td>
<td>Spell check</td>
<td>CoWiter</td>
<td></td>
</tr>
</tbody>
</table>

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**Sentences with Multiple Elements and Multiple Solutions**

| Multiple adjectives and adverbs | Rebecca had blue eyes. She had curly hair. Her hair was brown. Rebecca had curly brown hair and blue eyes. |
| Multiple prepositional phrases | The deer grazed. They grazed in the open field. It happened in the evening. The deer grazed in the open field in the evening. |
| Multiple Adjective Clauses | Mike has a new surfboard. It is made of fiberglass. It is easy to carry. Mike’s new surfboard, made of fiberglass, is easy to carry. |
| Multiple adverb clauses | The cyclist trained for many hours. It was extremely windy on the day of the race. He did not score in the top ten. Although the cyclist trained for many hours, he did not score in the top ten because of extreme winds on the day of the race. |
**Technology to support expression**
To plan and express what they know

**Digital Writing**

- Digital text has rapidly become the leading form of writing. The National Council of the Teachers of English (2007).
- Today, writing is not a pencil/paper task, nor just a word processing task. It also can take the form of:
  - gathering
  - posting
  - discussing information via the Internet
  - producing online publications using text and multimedia.

**Technology-based strategies and accommodations**

* Knobel and Wilber (2009) contend that in addition to reading, writing, listening and speaking, students in a digital age need to be able to review, critique, tag, record, remix and collaborate to generate work digitally.

* New technology tools typically outpace instructional methods, and educators need to be open to innovative technologies that support literacy development Coiro and Castek, 2011).
**Clicker 7**

* In all MCPS classrooms: UDL
* Incorporates planning (Clicker board graphic organizers) to writing to proofing
* Touch screen friendly, eye gaze and switch access,
* Childrens TTS voices, Voice notes, spelling support, word prediction,
* Word grids, Pix library, can be used at school and home

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**Write: Online- Writing Frames**

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**Planning Tools**

* Concept mapping as “an instructional strategy used to categorize information into a graphic form, creating a visual representation of the text structure and associated personal knowledge within that display” (Sturm and Rankin-Erikson (2002, p. 125).
Planning Tools: Research

* Concept mapping software (Inspiration) and hand drawn concept maps were compared to no-map conditions. The results showed that essays were longer and of higher quality under both concept map conditions. (Sturm and Rankin-Erikson (2002)).

Planning Tools: Research

* Englert, et al. (2007) investigated the use of web-based concept maps that also included writing prompts to support expository (informational) writing structures for students with and without disabilities ages 9 and 10. Students in the web-based condition produced longer texts and had higher ratings on writing rubrics.

Planning Tools: Research

* A 2011 meta-analysis of the use of graphic organizers with upper elementary, middle and high school students with LD found moderate to large effect sizes in the ability of graphic organizers to increase vocabulary knowledge, comprehension, and inferential knowledge, as well as a moderate effect size for the maintenance of skills weeks later (Dexter & Hughes, 2011).

Inspiration- Organizing ideas

* Support your main idea with subtopics. Create a visual organizer in a few minutes and use the concept map to simplify complex ideas and data. Click to edit the example and drag to reorganize.
Multimedia Tools

* Zhang (2000) conducted year-long case studies of five 5th grade students with learning and behavioral disabilities, reading at 2nd and 3rd grade levels. Though intelligence quotients were within normal limits, these students often refused to write.

* The students used specially designed software using text, graphics, and sound to write personal narratives

* All students demonstrated small but definite writing improvements.

* More importantly, the students were more engaged, and three of these very reluctant writers produced far more writing than they had ever produced in the past.
Photo Story

Photo Story 3 for Windows

Welcome to Photo Story 3 for Windows

Photo Story helps you to create exciting video stories by adding panning and zooming effects to your pictures.

Use Photo Story to record narration for your pictures, and add titles and background music to your story. You can also share your story in a variety of ways.

Select one of the following options, and then click Next.

- Begin a new story
- Get a project
- Play a story

Photo Story Narrative
free Windows tool
(photos plus text/music)

Chilling Out with Tango

Animoto Individual, school and district plans (1:32)

Presentation Tool: Prezi
Obtaining Student Input on Technology

* An important element is consulting with students directly to determine what technology works for them.

* In the study by Cullen et al. (2008), students were able to identify what was useful when using the software and what they learned while using it.

* Evmenova et al. (2010) conducted student interviews which indicated that students were able to articulate how their writing was deficient and which programs and features were beneficial.

The ability to convey meaning artfully across different types of writing, for different audiences is the long-term objective of writing instruction.

For many struggling writers, the lack of solid lower order foundational skills competes with the ability to compose text.