

*AT Now! Conference*  
*Feb 23, 2015*

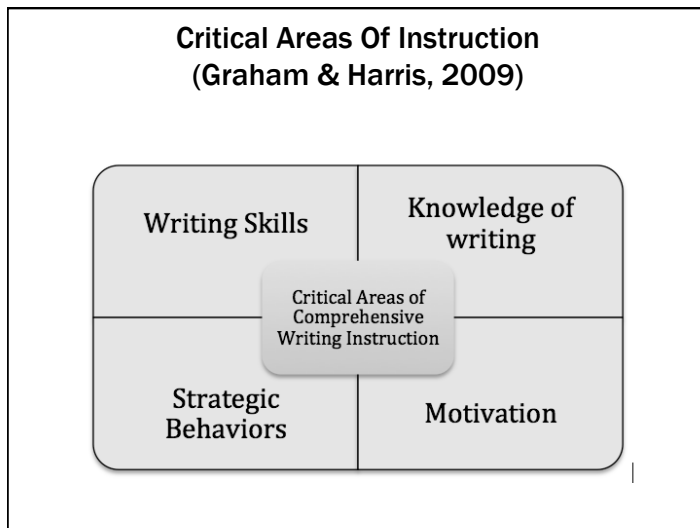
Evidence-Based Strategies  
 to Address Writing for All  
 Students

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**THE BALANCE OF INSTRUCTIONAL NEEDS**

Particularly for our struggling writers, we need to have a clear grasp on the status of foundational, lower order skills (handwriting, keyboarding, spelling, and other conventions), so that more mental energy can be allocated to the higher order skills of composing (planning, organizing, generating content and revising).

Without a balance of instruction, the gap in writing abilities widens significantly affecting self-efficacy and, thereby, the motivation to write. This negative pattern can be evident in elementary school and becomes more difficult to reverse at secondary levels.



Writing instruction geared to student needs

Today's teachers need to provide customized instruction to address

- 1) Writing skills (e.g., fluent handwriting or keyboarding, spelling, sentence construction),
- 2) Knowledge of writing (e.g., genres and text structures, process writing),
- 3) Strategic behaviors (e.g, self-regulation strategies to plan, generate text and revise), and
- 4) Motivation (e.g., attitude toward writing, persistence, self-efficacy)

•(Graham & Harris, 2009)

## Agendas

### Evidence based interventions

- Handwriting
- Keyboarding
- Spelling
- Composing
- Assistive Technology

## Handwriting

### Evidence-Based Instructional Handwriting Interventions




### 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.

<http://otswithapps.com/ots-with-apps-mtool-kit-6-2-2013/ots-with-apps-handwriting-apps/>



**Apps for letter formation**

**OT's with Apps – Handwriting App List**  
Handwriting Apps List (1-2015)


OT's with Apps Handwriting App List			
ABC Clamp Monkey	iPhone/iPad	Construct letters and words from shapes (sticks and circles).	0.99
Dexterity	iPad	Fine motor/visual motor skill development and handwriting readiness	4.99
iWriteWords	iPhone/iPad	Letter/number identification and formation app.	Lite/2.99
Letter School	iPhone/iPad	Highly interactive letter	Lite/4.99

<http://otswithapps.com/2014/03/25/ots-with-apps-manuscript-handwriting-app-feature-match/>

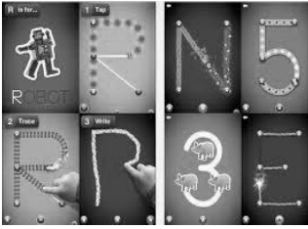
**OT's with Apps Feature Match**

Topic: Manuscript Handwriting Apps for IOS

App Name →	Ready to Print	Touch Write	Letter School	iWrite Words	Writing Wizard	Little Writer Pro	Start Dot Handwriting	Wet, Dry, Try	ABC Pocket Phonics	iTrace
Features ↓										
Devices	iPad	iPad, iPhone	iPad, iPhone	iPad, iPhone	iPad, iPhone	iPad, iPhone	iPad	iPad	iPad, iPhone	iPad, iPhone
Cost	9.99	2.99	2.99 (free/lite)	2.99 (free/lite)	2.99	1.99 (free/lite)	4.99	6.99 for 1 student	6.99 (free/lite)	3.99 (free/lite)
Data Collection	yes, can email data	no	saves user progress on 3 users	saves user progress	yes, can email data	no	saves progress on users	yes, assessment and progress	yes, email reports to parents/staff	yes, no email (use screenshot) detailed data errors
Manages multiple users	yes	yes	yes, 3	no	yes	no	yes, unlimited	yes, 4 users	yes, 36	yes
Ability to customize accuracy, level of support, speed, etc	yes/level of support, % of accuracy, linewidth	yes/visual supports, linewidth, colors	yes/ typeface	yes/ (in IOS settings) menu/high contrast, lefty/difficulty	yes/ time, sounds, difficulty, speed, languages	no	yes/ free printable worksheets sky/grass/ dirt method	yes/lefty kinesthetic option, user avatar, 3 levels, toggle verbal cues	yes/set % of accuracy, lefty, research prompts, 49 page guide for teachers, parents	yes/ lefty, customize which letter formation prefer, visual perception "rewards"



**Writing Wizard**



**Letter School**

**Writing Quality plus Automaticity**

Tucha, et al. (2008) contend that an over emphasis on neatness during instruction can have a negative effect on fluent writing production.

- Based on their research, they concluded that today's handwriting instruction focuses more on well-formed handwriting and neglects speed of handwriting and orthographic automaticity.

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

- Interventions of less than 20 sessions that do not include direct handwriting practice are ineffective. (Hoy, Egan, and Feder (2011))
- Individual and small group direct instruction on letter formation along with activities to promote speed and accuracy can improve handwriting and written expression. (Jones and Christensen, 1999 )
- Handwriting instruction should focus on letters similar in formation, but learning the names of each letter is also essential. (Graham, 2010)

### CCSS and Handwriting

The Common Core State Standards only refer to handwriting fluency and legibility in kindergarten and 1<sup>st</sup> grade

- There is no evidence that most children can achieve this within those two years.
- This contradicts what the research shows —that copying and orthographic-motor integration speeds show gradual improvement well beyond the primary grades
- It also disregards the impact of handwriting fluency on writing quantity and quality.

### Classroom Instruction in the Primary Grades

Graham (2010) suggests that handwriting be taught in the primary grades (1<sup>st</sup> to 3<sup>rd</sup>) 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

- Jones and Christensen (1999) 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).



## Instructional Handwriting Research

Jones and Christensen (1999)

- 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.

## Instructional Handwriting Research

- Graham, Harris and Fink (2000) conducted a six-month study with 1<sup>st</sup> 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/vwy/xkz/jq).
- There were three 15-minute lessons per unit to total 27 lessons.

## Instructional Handwriting Research

- 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 before moving on the next unit of three new letters.
- Improvements were maintained after six months.

Graham, Harris and Fink (2000)

## Instructional Handwriting Research

Graham, Harris and Fink (2000)

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

**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.

(Berninger, Vaughan, Abbott, Abbott, Brooks, Rogan, Reed, & Graham, 1997)

**A summary of what the current evidence tells us about instructional handwriting interventions:**

- Manuscript is easier than cursive for young writers.
- Fluency of handwriting is key, whether it is manuscript, cursive or a combination.
- Handwriting instruction should focus on letters similar in formation, but learning the names of each letter is also essential.
- Fine motor training influences letter formation, but not automaticity or fluency.
- Orthographic-motor integration shows gradual improvement well into the secondary grades.
- Handwriting speed develops over time as a consequence of writing connected text, not just repeatedly copying letters in isolation.
- Interventions of less than 20 sessions that do not include direct handwriting practice are ineffective.
- 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.

**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.

**A word to OT Practitioners working with emergent level writers**

- Foster motor control at the level of a student's understanding of the function and forms of print
- With emergent writers, encourage writing and drawing together, adding words to the picture

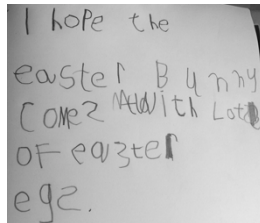


Kindergarten  
Level I  
"Testing"

[www.iss.k12.nc.us](http://www.iss.k12.nc.us)

### A word to OT Practitioners working with emergent level writers

- Begin handwriting instruction with the letters in the child's name through share-the-pen activities
- When students are ready to work on individual letters, group letters by formation
- Emphasize the name of the letter and the sound.
- Keep independent writing samples (unedited) across the year
- Poor handwriting should not impede literacy development

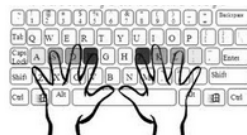


### General Handwriting Recommendations

- Incorporate writing into therapeutic activities at the student's level of phonological ability
- Build handwriting automaticity
- Value writing fluency and generating meaning over neatness
- Gradually help students move from writing words to phrases to sentences to paragraphs
- Understand writing development
- Understand the student's level of reading and phonological development as this is key to fluent writing
- Encourage inventive spelling when students are at early early stages of phonetic development

## Keyboarding

Evidence-Based Instructional  
Keyboarding Interventions



### 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 3<sup>rd</sup> to 6<sup>th</sup> grades weekly keyboarding instruction for a full school year using two different methods:

1. Teacher-directed alphabetic approach (Diana King Method)
2. Software-directed home keys approach (Type to Learn software).

	Alphabetic Approach WPM	Software Approach WPM
3 <sup>rd</sup> grade	5.1	6.4
4 <sup>th</sup> grade	6.5	7.8
5 <sup>th</sup> grade	8.4	9.8

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

### Instructional Concerns

- Bullock and Schmertzing report that the dilemma for teachers is the amount of time that must be allocated in order to reach functional speeds in elementary school.
- Other authors argue that there is limited access to computers in schools to conduct sufficient keyboarding instruction to reach functional levels (Zeitz, 2008).

### 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.




**Scope and Sequence for Keyboarding Instruction**  
Bartholome (1998)

Level	Focus	Practice
Elementary	Home keys	
	Alphabet keys and common punctuation marks	Spelling words and short writing activities
	Alphabet keys, numbers and common symbols	Integrate keyboarding into language arts
Middle School	Review and reinforce keyboarding skills	Personal use, reports, essays
High School	Advanced uses of keyboarding	Business applications

### 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.



**TypingClub**

### 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.

A summary of what the current evidence tells us about instructional keyboarding interventions:

- Students must move beyond copying using keyboarding software to composing using keyboarding in real world situations
- By middle school, it is expected that students are familiar with keyboard layouts and can begin to use keyboarding routinely for school-related assignments.
- By high school, the assumption is that students have achieved keyboarding automaticity with speeds approaching that of adult users.
- Average adult fast keyboarding speed is around 33 WPM
- Deciding on keyboarding as an accommodation should be based on comparative handwriting and keyboarding data.
- Touch typing fluency as measured by words per minute should be monitored regularly to determine the viability of using keyboarding as an educational accommodation.

Spelling should also be monitored, as poor spelling contributes to keyboarding disfluency.



## SPELLING

### Current research and evidence-based interventions

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.

### Explicit spelling instruction is needed

- In 2000, the National Reading Panel published a report based on a research review listing five key areas of instruction:
  - phonemic awareness
  - Phonics
  - reading fluency,
  - vocabulary
  - comprehension (Eunice Kennedy Shriver National Institute of Child Health and Human Development, 2000).
- Instruction specific to spelling was not included.

### 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.

### 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)
- 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.

## Persistent Spelling Difficulties

(Maughan, et al., 2009)

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

Poor spellers without explicit instruction, appear to learn to spell a smaller proportion of words through reading and writing as compared to good spellers

(Morris, Blanton, Blanton, Nowacek & Perney, 1995; Graham, 1999).

## Classroom Spelling Practices



- The Friday 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 1<sup>st</sup> to 3<sup>rd</sup> 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).

## Classroom Spelling Practices

- Graham, et al. (2008) found that only about 5% of students’ time spent at school was dedicated to spelling instruction, which is similar to educational practices reported 100 years ago.
- Their survey also found that 42% of teachers do not adjust instruction for students who struggle with spelling.
- When they do make adaptations, it is more often in the form of reducing the number of words on the weekly spelling test, re-teaching the words on the test, lessening spelling homework, or offering spelling aids.

### Weekly spelling tests mask linguistic knowledge

- Morris et. al (1995) studied the spelling performance of four 3<sup>rd</sup> 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 3<sup>rd</sup> grade students

(Morris, Blanton, Blanton, Nowacek and Perney, 1995)

	High Spelling Group	Low Spelling Group
Pretest	55%	13%
Weekly Test	96%	83%
6 Week Review Test	85%	49%
End of Year Posttest	86%	46%

### Individualizing Instruction

- 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.

### Individualized Assessment

- Individual student assessment is key to instructional planning. The best approach to evaluate spelling performance and competence is through connected writing samples and dictated word inventories.
- It is important to note that error pattern analysis is a form of assessment and is not a method of instruction. Instruction focusing only on students' misspellings builds negative attitudes toward spelling.

Apel et al. (2004b)

## 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).

## Instructional Trends Today

- 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).

## CCSS Standards

- Kindergarten students are expected to associate letters with their sounds (/m/=m)
- 1<sup>st</sup> grade students are expected to spell one-syllable words with one-to-one sound to letter correspondence (/m/a/p/= map) and learn to spell high frequency words.

## CCSS Standards

- Second graders are expected to generalize learned spelling patterns when writing words, (say > may > tray) along with more high frequency words.
- Third graders are expected to learn more spelling patterns within words (e.g., word families, and spellings that depend on the position of the letters within a word (ck/ back; kn/ know), as well as irregular, multisyllabic words and basic prefixes (re-, -un, mis-) and suffixes (-est, -er).

### CCSS Standards

- From grade four to grade 12, the CCSS standards relative to spelling are very general (e.g., “Spell grade appropriate words correctly”).
- Spelling is hardly mastered by the 4<sup>th</sup> grade, so there is some criticism that the CCSS standards do not explicitly address spelling in the higher grades (Schlagal, 2013).

### CCSS Standards

- Carreker (2012) states that in the 4<sup>th</sup> grade, students are expected to learn more about root words, prefixes and suffixes
- By 5<sup>th</sup> grade students acquire more understanding of derivational word forms (bio, biology, biological).

### Long term spelling deficits

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



### Persistence of Spelling Deficits

- Moats (1996) contends that adolescent students with severe phonological impairments may make relatively small gains even with good instruction.
- Cassar et al. (2005) found that older students with dyslexia made progress similar to that of younger students, but that for some students, the spelling hurdles proved difficult to overcome.

### Persistence of Spelling Deficits

- Khami and Hinton (2000) note that 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.

### Reading and Spelling Connections

- Fayol, Zorman and Lete (2009) examined the relationship between reading and spelling in 1,453 5<sup>th</sup> graders who were asked to read and spell regular, irregular and pseudowords.
- The results showed that most good readers were good spellers and conversely, poor readers were poor spellers

### Spelling Lists for Instruction

- Instead of a list of 10 to 20 unrelated words to memorize for one week, the trend today is to provide students with groups of words that have similar patterns.
- Using a multi-linguistic approach, the goal is for students to recognize the letter patterns and then generalize this to untaught words.


### Spelling Lists for Instruction

- Currently, spelling basals are available that are organized by grade level and may offer a prescribed list of spelling words that may not be commensurate with multilinguistic spelling principles.
- Spelling researchers contend that single grade level spelling books do not meet the needs of all students in a classroom (Schlagal, 2013, Templeton & Morris, 2000).



### Traditional vs. Multilinguistic Instruction

- Apel, Masterson, and Hart (2004a) conducted traditional spelling instruction in one 3<sup>rd</sup> grade classroom, while another 3<sup>rd</sup> 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.




### 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 independent generalization to 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



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**

*Making Words* Series by Cunningham and Hall (2008a, 2008b)

- 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 add a letter to make *win*, then change it to *pin*, then add a letter to make *spin*, then add another letter to make *spine*.

## Spelling Instruction Strategies

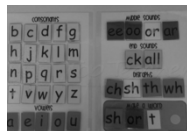


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  - *in > win > pin > spin > spine*

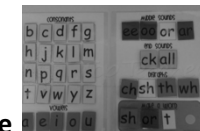
## Spelling Instruction Strategies



- **To improve orthographic knowledge**

- *Words Their Way* by Bear, Invernizzi, Templeton and Johnston (2011), based on the work of Henderson and Beers (1980)
- Provides a systematic, word study approach to teaching spelling and reinforcing word recognition.
- An assessment of each child's instructional level of word knowledge is conducted.
- Children start out by naming and sorting words based on new spelling patterns (e.g., make-take-bake; hide-side-ride).

## Spelling Instruction Strategies



- **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)

## Spelling Instruction Strategies

### To improve morphological knowledge

Word Relatives strategy (Wasowicz, Apel, Masterson, and Whitney (2004).

- 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.

## Spelling Instruction Strategies

### To improve knowledge 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.
- 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.
- “Look-say-cover-write-check” is an effective study strategy for irregular words (Schlagal , 2013).

## 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)
- Alphabet writing (5 minutes): (Using two letters that are difficult for him or her to form correctly based on a pretest).
- Word building (4 minutes; 2 rimes per unit): The student build words using consonants, blends or digraphs (cat, fat, flat, that) using letter

## Spelling instruction combined with handwriting

- 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 (5minutes): 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)

**A summary of what the current evidence tells us about instructional spelling interventions:**

- Multi-linguistic approaches are more effective than traditional spelling instruction.
- Spelling instruction should be tailored to individualized needs. The Friday one-size-fits all spelling test is not individualized.
- Reducing the number of words on the weekly spelling test, re-teaching the words on the test, lessening spelling homework, or offering spelling aids are adaptations, not individualized instruction.
- Single grade-level spelling books and whole class instruction implies that one-size-fits-all approach.
- Individual student spelling assessment is key to instructional planning.
- Analyzing students' error patterns allows educators to evaluate students' current linguistic understandings and future instructional needs.
- Targeted word lists should be based on an assessment of the student's instructional level.
- 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.

## Transdisciplinary Approaches

- The 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.
- 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 + “Share the pen”



## COMPOSING

Current research and evidence-based interventions

## Evidence-Based Writing Strategies

2007 Meta-analysis of instructional writing strategies (Writing Next report, Graham & Perin, 2007b).

Strategies	Examples
<p><b>Strong positive effect sizes (≥.80)</b></p> <ul style="list-style-type: none"> <li>• Writing strategies to explicitly teach planning, revising and editing of compositions (.82)</li> <li>• Summarization strategies (.82)</li> </ul>	<ul style="list-style-type: none"> <li>• Self-Regulated Strategy Development (SRSD) (De La Paz &amp; Graham, 2002)</li> <li>• Teaching and progressively fading summarization strategies</li> </ul>
<p><b>Moderately positive effect sizes (≥.50)</b></p> <ul style="list-style-type: none"> <li>• Collaborative Writing</li> <li>• Setting product goals</li> <li>• Word Processing</li> <li>• Sentence Combining</li> </ul>	<ul style="list-style-type: none"> <li>• Students work together to plan, draft, revise and edit compositions</li> <li>• Teachers establish writing goals and benchmarks to produce different types of writing</li> <li>• Use of word processing software, including spell checkers</li> <li>• Alternate approach to grammar instruction to create more complex sentences</li> </ul>

### Evidence-Based Writing Strategies

<p>Mildly positive effect sizes (≥.20)</p> <ul style="list-style-type: none"> <li>• Pre-writing strategies</li> <li>• Inquiry Activities</li> <li>• Process writing approaches (.32)</li> <li>• Study of models (.25)</li> <li>• Writing for content area learning (.23)</li> </ul>	<ul style="list-style-type: none"> <li>• Visual representations (concept maps, graphic organizers), brainstorming, group planning, reading materials to stimulate ideas</li> <li>• Engaging students in activities that will develop content for specific writing tasks (e.g., data review, interviews, hands-on activities, dramatization)</li> <li>• A framework for writing that includes goal setting, defining audience, using resources to plan, draft and revise</li> <li>• Students analyze models of good writing across different types of writing</li> <li>• Writing as a tool to summarize, analyze, interpret, explain, comment, or elaborate on academic topics</li> </ul>
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*Teaching elementary schools students to be effective writers: A practical guide*  
(Graham et al., 2012) (NCES 2012-4058)

The authors affirm that writing:

- Begins with the development of foundational skills (handwriting, spelling, sentence construction and typing)
- Is followed by the gradual achievement of more complex and refined writing techniques.
- Should emphasize the writing process (i.e., drafting, sharing, revising, editing, evaluating, and at times, publishing)
- Must address the vital role of technology (e.g., typing, word processing, computer skills, Internet navigation, web-based tools),
- Must undergo ongoing assessment to guide instruction

U.S. Department of Education, Institute of Education Sciences recommendations for teaching elementary students to be effective writers (Graham, et al. 2012)

Recommendation	Purpose	Research-Based Strategies
1. Provide daily time for students to write.	To learn and practice writing skills, strategies and techniques, integrated into content instruction.	30 minutes per day in Kindergarten. A minimum of 1 hour per day starting at 1 <sup>st</sup> grade with 30 minutes devoted to grade-appropriate writing skills, strategies and techniques, as well as, 30 minutes for writing practice to apply new learning
2. Teach students to use the writing process for a variety of purposes. 2a. Teach students the writing process. 2b. Teach students to write for a variety of purposes.	To think critically about purpose, planning what to say and how to say it. To use the writing process effectively and flexibly for a variety of real-life purposes and audiences.	<ul style="list-style-type: none"> <li>• Self-regulated strategy instruction*</li> <li>• Goal setting</li> <li>• Teach forms/genres of writing (story grammar, KWL charts, STOP, DARE, TREE strategy*)</li> <li>• Planning (POW strategy*, ordering ideas, outlining)</li> <li>• Drafting (emulating exemplary text, sentence construction)</li> <li>• Sharing (peer partners, "author's chair")</li> <li>• Evaluating (self-evaluation, self-monitoring)</li> <li>• Revising and editing (peer revising, COPS editing strategy)</li> <li>• Publishing (classroom displays, gallery walks, school websites,</li> </ul>

(Graham, et al. 2012)

3.	<i>Teach students to become fluent with handwriting, spelling, sentence construction, typing, and word processing.</i>	To master foundational skills in order to allocate more attention to composing.	<ul style="list-style-type: none"> <li>• Learning letter formations and writing letters from memory</li> <li>• Spelling skills: phonological awareness, sound structures of groups of letters, morphological spelling</li> <li>• Spelling by analogy</li> <li>• Personal spelling dictionaries</li> <li>• Sentence Construction (sentence framing, sentence expanding, sentence combining)</li> <li>• Introduce typing in 1<sup>st</sup> grade with regular practice in 2<sup>d</sup> grade, typing faster than handwriting by the end of 2<sup>nd</sup> or 3<sup>rd</sup> grade</li> <li>• Using word processing beginning in 1<sup>st</sup> grade with the ability to produce and revise text using a word processor by the end of 2<sup>nd</sup> grade; using spelling and grammar</li> </ul>
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(Graham, et al. 2012)

4.	<i>Cultivate an engage community of writers.</i>	To collaborate with others to fully engage in the writing process utilizing constructive feedback from peers and teachers.	<ul style="list-style-type: none"> <li>• Teachers modeling writing</li> <li>• Provide choice in writing assignments</li> <li>• Topic journals</li> <li>• Curriculum content-related writing prompts</li> <li>• Collaborative writing; share-the-pen</li> <li>• Guided peer editing, teaching students how to give and receive feedback</li> <li>• Teacher-student conferencing with emphasis on meaning over form in earlier drafts.</li> <li>• Author's chair</li> </ul>
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Strategies for Beginning Writers

In the DWP e-book

Spandel (2012)

Strategies	Purpose	Examples
Planning	Building on children's experiences	Primary forms of prewriting: <ul style="list-style-type: none"> <li>• Talking</li> <li>• Drawing</li> <li>• Listing details</li> <li>• Listing questions</li> <li>• Simple idea webs</li> <li>• Interviewing</li> </ul>
Drafting	Writing as a form of communication to convey a message and ideas.	Primary writing formats: <ul style="list-style-type: none"> <li>• Drawing wordless books</li> <li>• Drawing plus writing</li> <li>• Writing a story</li> <li>• Writing a letter</li> <li>• A poem</li> <li>• Cartoon bubbles</li> </ul>
Revising	Self-talk or sharing with a partner to see what can be added to alter the content	<ul style="list-style-type: none"> <li>• Adding a picture detail</li> <li>• Adding another drawing</li> <li>• Adding words to enhance the drawing</li> <li>• Adding phrases or a sentence</li> <li>• Changing words</li> </ul>
Editing	Polishing the work, making it more visually appealing, fixing distracting errors, making it easier to read.	<ul style="list-style-type: none"> <li>• Checking the presentation of the work (cover, illustrations, handwriting or fonts)</li> <li>• Checking for basic conventions</li> </ul>
Publishing (student choice)	Writing for a purpose	<ul style="list-style-type: none"> <li>• Posting the work on the wall</li> <li>• Adding "book features" (cover, title page, credits, dedication, about the author, other graphics)</li> </ul>

Examples of process writing activities suitable at the elementary level

In the DWP e-book

Olinghouse and Wilson (2012)

Writing Process	Examples of Tasks
Planning	<ul style="list-style-type: none"> <li>• Brainstorming</li> <li>• Graphic organizers</li> <li>• Story planners</li> <li>• Outlining</li> <li>• Dramatizing</li> <li>• Researching</li> <li>• Summarizing and organizing notes</li> </ul>
Drafting	Rough draft, 1 <sup>st</sup> drafts and final drafts <ul style="list-style-type: none"> <li>• Working from an outline or graphic organizer</li> <li>• Using a word processor</li> </ul>
Revising	<ul style="list-style-type: none"> <li>• Adding words, details or information</li> <li>• Removing unnecessary information</li> <li>• Restructuring text or reorganizing sections</li> <li>• Evaluating "voice " or "tone"</li> </ul>
Editing	<ul style="list-style-type: none"> <li>• Rereading and checking for conventions, including spelling</li> <li>• Using synonyms to replace repetitive words</li> <li>• Editing checklists</li> </ul>
Publishing	<ul style="list-style-type: none"> <li>• Producing a final copy to display or share</li> <li>• Creating a book</li> <li>• Adding a cover or title page</li> </ul>

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

*“Young writers cope with the multiple demands of handwriting and composing by minimizing the composing process (planning, organizing, etc.). Because so much of their thinking must be devoted to forming legible letters, they turn composing into a knowledge-telling process in which writing is treated as a forward-moving, idea-generation activity. A relevant idea is generated and written down, with each new phrase or idea serving as the stimulus for the next one.” (Graham, 2010, p. 50).*

## 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 lessons (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.

## Cognitive Processing: Planning

Intermediate Years (grades 3-5)

- Typically, fluent transcription is demonstrated by 4<sup>th</sup> grade, allowing for longer written texts.
- In the intermediate grades (3<sup>rd</sup> to 5<sup>th</sup> 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).

## Cognitive Processing: Planning

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 5<sup>th</sup> 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).

## Cognitive Processing: Planning

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 Lasonde and Richards, 2013)

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

## 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).



## Cognitive Processing: Revising

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 6<sup>th</sup> 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.

## Cognitive Processing: Revising

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).

## Teacher Influence on Revising

- Teacher instruction is highly influential as demonstrated in Gutierrez's (1994) three-year classroom study of elementary classrooms.
  - In classrooms where teaching writing is highly scripted, students participate less and make fewer decisions.
  - Teacher-student collaboration increases when teachers are less directive and more responsive to students.
- Lensmire (2000) argues for more of a balance between complete teacher control and complete student autonomy.

Four stages for instruction on Revising

(adapted from Moore et. al, 2011).

Revision Stages	Instructional Activities
Adding	<ul style="list-style-type: none"> <li>• Instruction on how to add words or phrases</li> <li>• Using a writing sample with very basic sentences, model how to add more colorful words and phrases</li> <li>• Use special colored revising pens</li> </ul>
Replacing	<ul style="list-style-type: none"> <li>• Replace boring or overused words</li> <li>• Using a writing sample with lots of boring words, model how to replace these words</li> </ul>
Reordering	<ul style="list-style-type: none"> <li>• Teach sequencing</li> <li>• Provide sentences on strips (i.e., simple recipes, story details) and model how to reorder these to create a more logical sequence.</li> <li>• Have student cut and paste the sentences to reorder their own writing</li> </ul>
Removing	<ul style="list-style-type: none"> <li>• Teach students to remove sentences or paragraphs that are not on topic or are distracting.</li> </ul>

### 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

### Primary Classroom Writing Practices

- Graham and Harris (2009) report that some primary teachers spent little time on writing instruction
- 40% of these teachers made few or no adaptations for struggling young writers.
- Students spent only 20 to 30 minutes per day writing, and rarely used computers and word processing at school.

## Classroom Writing Practices

- In their survey of English language arts (ELA), science and social studies teachers in 9<sup>th</sup> to 12<sup>th</sup> grades, they found that adaptations were applied infrequently, and writing assignments involved short answers, rarely involving multiple paragraphs.
- Science teachers taught writing the least, ELA teachers the most, but content classes overall did not teach a lot of writing.

## 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.

## Instructional Framework for Struggling Writers (Singer and Bashir, 2004)

### Foundations:

- Graphomotor skills (e.g., handwriting or keyboarding)
- Cognitive/linguistic skills (e.g., phonological skills, vocabulary, syntax, knowledge of genres, metacognitive skills)
- Social rhetorical knowledge (e.g., when and how to use writing genres)
- Writer beliefs and self-perceptions

### Instructional Framework for Struggling Writers (Singer and Bashir, 2004)

**Processes:**

- Planning (e.g. clear writing goals)
- Organizing (e.g., structuring and sequencing text)
- Generating text (e.g., ideas into text)
- Revising (e.g., making changes to improve text)
- Executive functions and self-regulation (e.g., regulating attention, self-monitoring)

### 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)

SRSD Stages	Description
Develop background knowledge	The teacher assesses the student’s level of knowledge for the skill to be taught and introduces the new strategy.
Discuss it	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.
Model it	The teacher models the new strategy using a think-aloud.
Memorize it	The student memorizes the mnemonic for the strategy.
Support it	Guided practice is used to help students gain mastery of the strategy
Independent performance	The student is able to use the strategy to independently compose.

### Explicit Strategies Within The SRSD Framework

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

### Explicit Strategies Within The SRSD Framework

<b>STOP AND LIST</b>	Stop Think Of Purposes  List Ideas Sequence Them	Goal setting, brainstorming and organizing strategy
<b>WWW, What-2, How-2</b>	<i>Think of a story</i> Who, What, Where What do the character(s) want to do What happens with the characters How does the story end How does the character(s) feel <i>Make notes for each part</i> <i>Write my story, add, elaborate,.....</i> <i>revise, make sense</i>	Story writing planning strategy
<b>SPACED</b>	Setting Purpose Action Conclusion Emotions, add .....	Story writing planning strategy

### Explicit Strategies Within The SRSD Framework

<b>TREE</b>	<i>Who will read my paper?</i> <i>Why am I writing this paper?</i> Topic sentence Reasons Examine reasons Ending <i>Write and say more</i>	Opinion writing strategy
<b>STOP and DARE</b>	Suspend judgment Take a side Organize ideas Plan more as you write  Develop topic sentence Add supporting arguments Reject arguments for the other side End with a conclusion	Opinion writing strategy
<b>POWER</b>	Plan: Brainstorm and group ideas Organize: Order explanations Write draft Edit with peer	Explanatory writing strategy that pairs with Think Sheets to scaffold steps

- ### 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 2<sup>nd</sup> 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.
  - 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 the sentence level, to the paragraph level, and then to the multi-paragraph level.

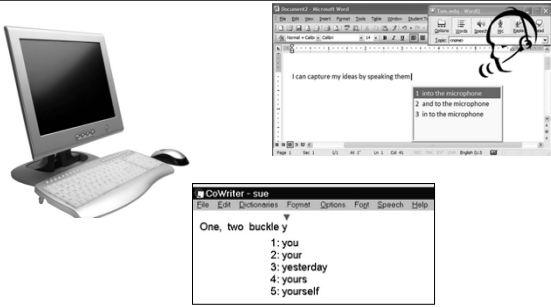
Examples of sentence construction exercises In the e-book  (Saddler, 2012)	<b>Topics of Instruction</b>	<b>Examples</b>
	<b>Sentence Basics</b>	
	• What is (and is not) a sentence	One or more complete thoughts <i>The leaves were falling vs. The leaves</i>
	• Noun verb sentences	<i>The cat napped.</i>
	• Expanded noun-verb sentences	<i>The cat napped on the couch.</i>
<b>Sentence Combining</b>		
• Compound structures with connectors: <i>and, for, nor, yet, so, but, or</i>	[Mary walked to town. Jose walked to town]. <i>Mary and Jose walked to town.</i> [They could travel by bus. They could travel by car] <i>They could travel by bus or car.</i>	
• Adverb structures	[I ran home. I ran quickly.] <i>I quickly ran home.</i> [We walked to the movies. We went after dinner.] <i>We walked to the movies after dinner.</i> [Josh took a summer class. He is learning algebra. (so) ] <i>Josh took a summer class to learn algebra.</i>	
• Noun modifiers	[The flowers were purple. They were blooming.] <i>The purple flowers were blooming.</i> [I saw a big cat. It was black.] <i>I saw a big, black cat.</i> [Robert played on the basketball team. He lived next door. (who)] <i>Robert who lived next door played on the basketball team.</i> [The dog barked loudly. The dog's name was Rex.] <i>The dog, barking loudly, was named Rex.</i>	

<b>Sentences with Multiple Elements and Multiple Solutions</b>	
Multiple adjectives and adverbs	[Rebecca had blue eyes. She had curly hair. Her hair was brown.] <i>Rebecca had curly brown hair and blue eyes.</i>
Multiple prepositional phrases	[The deer grazed. They grazed in the open field. It happened in the evening.] <i>The deer grazed in the open field in the evening.</i>
Multiple Adjective Clauses	[Mike has a new surfboard. It is made of fiberglass. It is easy to carry.] <i>Mike's new surfboard, made of fiberglass, is easy to carry.</i>
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.] <i>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.</i>
(Saddler, 2012)	

<b>Sentence Constructions at a Paragraph-Level</b>
Model paragraph from <i>The Wizard of Oz</i> (Baum, 2008). E-Text downloaded from Project Gutenberg.
<ol style="list-style-type: none"> <li>1. Dorothy got over her fright slowly. Hour after hour passed. She felt quite lonely. The wind shrieked so loudly. The wind shrieked all about her. She nearly became deaf.</li> <li>2. First, she wondered. Would she be dashed to pieces when the house fell again?</li> <li>3. The hours passed. Nothing terrible happened. She stopped worrying She resolved to wait calmly. She waited to see what the future would bring.</li> </ol>
<p><i>Hour after hour passed away, and slowly Dorothy got over her fright; but she felt quite lonely, and the wind shrieked so loudly all about her that she nearly became deaf. At first she had wondered if she would be dashed to pieces when the house fell again. But as the hours passed and nothing terrible happened, she stopped worrying and resolved to wait calmly and see what the future would bring.</i></p>
(Saddler, 2012)

**A summary of what the current evidence tells us about instruction that supports composition:**

- Teach students to write increasingly more sophisticated sentences.
- Provide opportunities for students to work together to plan, draft, revise and edit their compositions.
- An over-emphasis on editing can be discouraging. The goal of process writing is not to create perfect papers, but to allow students to grow as writers.
- Revising strategies should not be presented until a student is producing more writing. Instruction on revising is introduced in stages: adding, replacing, reordering, removing.
- Self-regulation strategies that help students set writing goals, self-monitor their writing, and more effectively make revisions are highly effective.
- Utilize ongoing assessment to guide instruction.



**TECHNOLOGY-BASED STRATEGIES AND ACCOMMODATIONS**

## Digital Writing

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

## Digital Writing

- 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) .

## Technology Availability

- Most teachers report having at least one computer and internet access in the classroom.
- Software available via central servers has increased the availability of applications across schools and classrooms (Gray, Thomas, & Lewis, 2010).
- Increasingly, technologies are becoming more mobile and ubiquitous such that teachers have more ways to integrate computer-related activities into instruction, through the use of interactive white boards, using computers as learning stations, or using laptops and mobile devices for composing.
- Ultimately, wireless broadband, bring-your-own-device policies, and more access to technology tools in classrooms may be what drive changes in instructional practices.

Technology for students with chronic difficulties with composing

e.g., note-taking and planning,

- ### Digital Note-Taking
- Students used voice notes (using a microphone) or text notes (using a keyboard). Both forms of note-taking were found to be effective Anderson-Inman, Terrazas-Arellanes, and colleagues (2009).
  - Teachers provided digital “guided notes.” The use of guided notes resulted in an increase in on-task behavior and improved scores on unit quizzes (Izzo (2008).
  - Outlining tools, electronic highlighting, and electronic annotation tools such as sticky notes and margin notes provide ways for students to collect facts, details and definitions prior to writing (Anderson-Inman (2009) .

- ### Digital voice note taking
- For students who are not yet ready to master voice recognition, voice recordings are an alternative. Applications for computers, tablets and smart phones are available to allow the user to voice record notes (e.g., Evernote, iAnnotate, Ghostwriter Notes )
  - More advanced notetakers such as the Livescribe Smartpen synchronize digital voice recordings to students’ handwritten notes so that they can hear the recording while viewing what they wrote.
  - Apps such as AudioNote, and Notability synchronize voice recordings with handwriting, typing, or drawing on mobile devices.
  - No significant research to date on these apps

#### Note Taking Apps

App	Features
Noteability	Write, keyboard, illustrate, annotate notes and link to an audio recording
iTalk	Audio records notes or reminders
Paper Port	Digital notetaking for iPad that includes audio recordings
Write Pad for iPad	Handwriting recognition: Turns handwritten notes into digital text; autocorrection and syncs with online file systems (Evernote, Google Docs, etc.)
iAnnotatePDF	Annotate on pdf, ppt, doc and share via online file systems. Can record audio notes
Evernote	Take notes, snap photos, record voice memos.



## 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).
- 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

- 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.
- 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).

<p style="text-align: center;">Planning apps</p> <p style="text-align: center;">Lynda S. Hartman Rev. 11/3/14 lhartman@nssed.org</p>	 <b>Lucidchart for Education</b> Free Chrome App Google Add-on	- can create and edit Lucidchart documents from Google Docs. - diagram is added directly into any document - any changes made in Lucidchart are automatically updated in the document.	
	 <b>MindMeister</b> Free Chrome App Google Add-on	- turns any bulleted list into a visual map - with the Google Add-On, the visual map is automatically inserted into the Google Doc	
	 <b>Padlet web site</b> <b>Padlet Chrome App</b> Free Need to register	- not really stickies - allows for collaboration - save as PDF to e-mail - print capability	- formerly called Waitwisher - Padlet recently announced (April 2014) that it is replacing its e-mail sign in to signing in using user names, which will be easier for student use. It is also adding a feature that will move teacher walls to a special URL to make it easier for students to access.
	 <b>Popplet</b> Free/Subscription options. web site Need to register	- can type, draw, bring in images, etc. - not really stickies, but can change colors - can link items - save as PDF or JPEG	- does not currently sync between iPad app and web/Chrome version

## Technology for students with chronic difficulties with writing and/or spelling

## Mainstream AT Tools

- Assistive technology options for students with spelling deficits can include mainstream tools such as spell checkers or autocorrection tools that are typically built into word processors
- Students with memory or attentional issues, who struggle to express their ideas, may prefer to type their ideas first and later use spell checking tools.
- Other students may prefer to correct their spelling as they go, using the “right click” option to immediately view suggested corrections and replace misspelled words.

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

**Supporting Struggling Learners in Chrome**

Home | General Information | Accessibility | Reading Tasks | **Writing Tasks** | Executive Functioning Tasks | Sample Workflows | Resources


### Writing Tasks

Perhaps the most common barrier to independently, efficiently and effectively completing writing tasks is related to fine motor challenges - students finding it laborious to write by hand and/or difficulty reading what was written. Spelling is another common barrier. For writing process activities, students may have difficulties with idea generation/elaboration, organizing ideas, generating a draft, recognizing errors and more. Chrome offers a number of tools to help support these students.

**TASK: Completing Writing Process Activities**  
[Some Web Based/Chrome Tools to Support Pre-Writing Tasks](#)  
[Some Web Based/Chrome Tools to Support Transcription - Drafting Tasks](#)  
[Chrome Tools to Support Spelling](#)  
[Some Web Based/Chrome Tools to Support Revising and Editing Tasks](#)

**TASK: Annotating/Notetaking**  
[Some Web Based/Chrome Tools to Annotate PDFs](#)  
[Chrome Tools to Support Online Notetaking](#)  
[Annotating Web Pages](#)



## Writing apps and extensions to support spelling and writing

<p>Google Voice Search </p> <p>Free Google Chrome Browser</p>	<p>- use dictation feature to ask for correct spelling, etc. - Click on the microphone icon in the search bar and say the word. Google provides the correct spelling.</p>	<p>Activate via Settings - Advanced Settings - Privacy ... then check to "Enable 'OK Google' to start a voice search.</p>
<p><a href="#">Grammarly Lite - Smart Spellchecker</a> <a href="#">Grammarly for Chrome</a></p> <p>Free, Premium Extension</p>	<p>- Works in Gmail, Facebook and other web pages</p>	<p>Does NOT work in Google Docs Could enter text in email, edit and then paste into a Google Doc?</p>

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### Extensions to support writing and spelling

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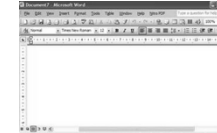
<p><a href="#">Read&amp;Write for Google</a></p>  <p>Free 30 day trial, then yearly subscription (individual and group rates) App and Extension</p>	<p><a href="#">Read &amp; Write for Google Docs Chrome extension</a></p> <p>- works in Google Docs</p> <p>- to select the predicted word via your keyboard, hold the Control key down and type the number of the word.</p>	<p>If choose to NOT purchase a subscription, after 30 days, text to speech and the translator function remains functional in Google Doc.</p> <p>- prediction choices are much improved than when the tool was first rolled out</p> <p>- increasing zoom size created some problems; need to keep zoom at 100% and use a larger font</p> <p>- when adding an end punctuation mark after select a word, you have a space that needs to be deleted</p>
<p><a href="#">Spell and Grammar Checker by Ginger</a></p>  <p>Free, Premium Chrome Extension</p> <p>Need to register</p>	<p>- Works in Gmail, PBWorks, class blogs, etc. (need to check your sites for functionality)</p> <p>- checks spelling, capitalization and grammar</p> <p>- can individually select a single error to correct in a sentence or to correct all errors in a sentence at one time</p>	<p>- does a nice job with poor spelling</p> <p>Does NOT work in Google Docs</p> <p>Could enter text in email, edit and then paste into a Google Doc?</p>

## Multimedia Tools

- Zhang (2000) conducted year-long case studies of five 5<sup>th</sup> grade students with learning and behavioral disabilities, reading at 2<sup>nd</sup> and 3<sup>rd</sup> 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.

## Word Processing

- A meta-analysis showed that, in general, the quality of students' writing was better when using word processing compared to handwriting (Graham and Perin (2007a, 2007b).
- Russell and Plati (2001) demonstrated that word processing experience was a critical factor in that high school students who were experienced with word processing and had a 20+ word per minute keyboarding rate, performed substantially better when using word processing.



## Word Processing

- Morphy and Graham (2012) identified 27 peer reviewed articles and dissertations that examined word processing.
- Students ranged from grades 1 to 12 with writing and reading deficits.
- There were positive effects for length of writing, development/organization, quality of text, reduction of mechanical errors, and student motivation.
- A strong correlation was found between length and quality, in that the more text and ideas were generated, the more this contributed to measured quality.

## Word processing with Instruction

- In a study where narrative and essay writing with upper elementary grade students with learning disabilities was compared to a control group of students with learning disabilities that did not receive instruction, word processing combined with instruction on planning, drafting, and revising resulted in greater improvements (MacArthur, Graham, Schwartz & Schafer, 1995).
- MacArthur (2009b) maintains that having students handwrite their drafts on paper and then type them into the computer results in missed opportunities to learn to use the full range of features of word processing software.

### 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).

### 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.

### Assistive Technology: Word Prediction

Assistive technology applications specifically designed for students with spelling deficits include word prediction and speech-to-text.

- 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 (anamlz/animals lfnt/elephant).
- Good word prediction applications can 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)

### Word Processing with Word Prediction

Lewis, Graves, Ashton & Kieley (1998) found that

- Students using word prediction increased their spelling accuracy, but were able to achieve 82 % 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.

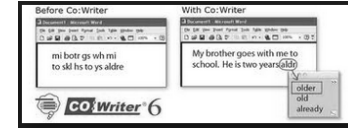
### Word Processing with Word Prediction

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.

### Word Processing with Word Prediction

- Mirenda, Turoldo, and McAvoy (2006) used three 10-minute writing samples to compare writing across three conditions (handwriting, word processing and word processing with word prediction). This study included 24 students (15 elementary, 1 middle school and 8 high school students) with physical disabilities and limited handwriting.

- Students had a higher percentage of legible words, correctly spelled words and correct word sequences when using Co:Writer



### CoWriter Universal Web-based word prediction Huge dictionary

**Co:Writer Universal**



**Extension**  
The extension is free to download.  
Requires purchase/license to use the extension

- |   |  |
|---|--|
| <ul style="list-style-type: none"> <li>- word prediction</li> <li>- works anywhere you can enter text</li> <li>- customized settings - prediction, speech, vocabulary level, topic dictionaries, etc.</li> <li>- allows for creation of new topic dictionaries</li> </ul> | <ul style="list-style-type: none"> <li>- student logs in using CW account</li> <li>- works across platforms ... e.g. can start writing on a Chromebook at school, finish on a laptop/iPad at home</li> </ul> |
|---|--|

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<https://sites.google.com/a/nssed.org/supporting-learners-in-chrome/writing-tasks>

### Word Processing with Word Prediction

- Handley-More, Deitz, Billingsley and Coggins' (2003) results indicated greater improvements for word processing with word prediction, as compared to handwriting, and word processing without word prediction for 4<sup>th</sup> and 5<sup>th</sup> grade LD students. No improvement was found in the speed of writing.

### Word Processing with Word Prediction

- Another study used three types of word prediction programs (Word Q, [www.goqsoftware.com](http://www.goqsoftware.com), CoWriter and WriteAssist). Overall, students increased their spelling accuracy from 58% to 96% across all programs

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

### Assistive Technology: Speech Recognition

- For students with severe dyslexia, for those who consistently struggle to retrieve MGRs, or for those who make little progress after many years of spelling instruction, speech recognition can enable students to write more fluently.
- Students speak in phrases or sentences, which are translated onto the computer screen, bypassing the encoding of every word they want to write.
- Students still need word recognition skills, the ability to cognitively multi-task, and understand the writing process to use SR effectively.

Speak Q ([www.goqsoftware.com](http://www.goqsoftware.com))

Dragon Naturally Speaking ([www.nuance.com](http://www.nuance.com))

### 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 and 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

- MacArthur and Cavalier (2004)
  - 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.

## Dictation to adult vs. computer

- Writing competes for internal resources (e.g., OMI, higher order thinking) in younger, less mature writers.

Bereiter & Scardamalia (1987) demonstrated that young writers (ages 6 and 7) produced longer, more elaborate texts when they orally dictated to an adult scribe (text not visible).

- Research also suggests that the reverse may be true for more mature writers. Dictation to an adult typist was less effective than writing by hand or by using a word processor for typically developing, more experienced writers (Torrance & Baker, 1998 as cited in Torrance & Galbraith, 2006).

## Speech Recognition

- Garrett, Heller, Fowler, Alberto, Frederick, and O'Rourke (2011) conducted an alternating treatment design comparing word processing and speech recognition to write first drafts with five high school students with physical disabilities.
- The results showed greater results for fluency as measured by characters per minute
- As well as greater length as measured by the overall number of words in the draft.



## 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
- SR did not improve the fluency or accuracy for typical, more fluent writers.

[bit.ly/srguide](http://bit.ly/srguide)

Speech Recognition as AT for Writing  
Cochrane & Key

In a systematic review of research on technologies to support written productivity, the reviewers concluded that while the quality of the evidence available thus far is at a moderate to low level, trends suggest that technology has a positive influence on students' performance and behavior.

(Batorowicz, Missiuna & Pollock, 2012.)

### Obtaining Student Input on Technology

- Another 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.

**A summary of what the current evidence tells us about technology-based strategies and accommodations**

- Computer technology and the Internet have changed the way writing is perceived, practiced and published. The role of the teacher has shifted from "manager" to that of a writing coach.
- Print is no longer the dominant form of communication and expression. Digital text has rapidly become the leading form of writing.
- New technology tools typically outpace instructional methods, and educators need to be open to innovative technologies that support literacy development.
- Students need to develop competencies using multiple literacies to construct and convey meaning when using the Internet and multimedia (e.g., social networking, web pages, discussion forums, podcasting, video content).
- Teachers at all grade levels need to incorporate technology across the curriculum, and across all content areas.
- As more mainstream digital tools are incorporated into the curriculum, it is easier students with disabilities to avail themselves of technology features that surmount learning barriers.
- Research trends suggest that technology has a positive influence on students' performance and behavior.

### Final Words....

- Start by clearly identifying student needs
  - What are the hurdles?
  - Handwriting, keyboarding, spelling, composing?
- Select proven strategies and interventions
- Match the features of tools to those student needs