Recommendations: 11 Key Elements of Effective Adolescent Writing Instruction as Identified by Meta-Analysis

This report provides long-needed guidance for teachers and policymakers by identifying specific instructional practices that improve the quality of adolescent students' writing. The special contribution of this report is that it draws from empirical evidence.

The authors set out to collect, categorize, and analyze experimental and quasi-experimental research on adolescent writing instruction in order to determine which elements of existing instructional methods are reported to be effective by research. The method used, meta-analysis, provides a measure of effectiveness using the effect size statistic. On the basis of the effect sizes found, *Writing Next* presents 11 elements of effective adolescent writing instruction. (A detailed description of the methodology used is found in Appendix A.)

Effective Elements to Improve Writing Achievement in Grades 4 to 12

1. Writing Strategies
2. Summarization
3. Collaborative Writing
4. Specific Product Goals
5. Word Processing
6. Sentence-Combining
7. Prewriting
8. Inquiry Activities
9. Process Writing Approach
10. Study of Models
11. Writing for Content Learning

No single approach to writing instruction will meet the needs of all students. Also, some extant techniques may be effective but have not yet been studied rigorously. There is a tremendous need for more research on and dissemination of adolescent writing interventions that work, so that administrators and teachers can select the strategies that are most appropriate, whether for whole classrooms, small groups, or individual students.

Though each instructional element is treated as a distinct entity, the different elements are often related, and the addition of one element can stimulate the inclusion of another. In an ideal world, teachers would be able to incorporate all of the 11 key elements in their everyday writing curricula, but the list may also be used to construct a unique blend of elements suited to specific student needs. The elements should not be seen as isolated but rather as interlinked. For instance, it is difficult to implement the process writing approach (element 9) without having peers work together (element 3) or use prewriting supports (element 7). A mixture of these elements is likely to generate the biggest return. It remains to be seen what that optimal mix is, and it may be different for different subpopulations of students. However, it is important to stress that these 11 elements are not meant to constitute a curriculum.

The instructional elements are ordered according to their average effect. Therefore, elements with larger effect sizes are presented before those with smaller effect sizes. However, many of the effect sizes differ only minimally, so readers should be cautious in interpreting the differences in effect strength. Appendix B lists references for the studies used in determining the elements, in the same order as the elements.

The report's findings are based strictly on experimental and quasi-experimental research, as this is the only type of research that allows for rigorous comparison of effects across studies. While a range of methodologies have been used to study writing—from research into the history of writing instruction to surveys of student attitudes about writing to studies that aim to describe the actions of particularly successful teachers—there have been few efforts to compare the effectiveness of specific teaching strategies. Meta-analysis fills this gap.

It is also important to note that the findings in this report are cumulative, in that they build on earlier meta-analyses of writing instruction (Bangert-Drowns, 1993; Bangert-Drowns, Hurley, & Wilkinson, 2004; Goldberg, Russell, & Cook, 2003; Graham, 2006; Graham & Harris, 2003; Hillocks, 1986). This report includes all of the studies of adolescents reviewed in the prior meta-analyses. Further, the report adapts some of the earlier authors' categorizations of instruction, such as some of those used by Hillocks (1986). In addition, these earlier meta-analyses have been considerably extended by (a) updating the earlier findings; (b) reorganizing earlier instructional categories to incorporate newer findings; and (c) examining the impact of instruction more recently studied.

Benefits of Meta-analytic Approach

By their very nature, meta-analyses are concerned with quantitative data; as noted above, this report looked at experimental and quasi-experimental research on writing instruction. Its conclusions should in no way detract from the important contributions that other types of research make to an understanding of how to teach writing. For instance, the report's conclusions do not reflect the findings from a number of excellent observational studies that examine the writing practices of effective teachers of writing (e.g., Pressley, Yokoi, Rankin, Wharton-McDonald, & Mistretta, 1997), studies that measure the correlations between writing performance and particular teaching procedures (e.g., Applebee, Langer, Nystrand, & Gamoran, 2003), or single-subject design studies (e.g., De La Paz, 1999). Likewise, many perspectives, including cognitive (Hayes, 2000), sociocultural (Prior, 2006), and discourse (Chafe & Tannen, 1987), inform the study of writing (Sperling & Freedman, 2001).

THE OPTIMAL MIX

In the medical profession, treatment is tailored to individual patient needs; at times, more than one intervention is needed to effectively treat a patient.

Similarly, educators need to test mixes of intervention elements to find the ones that work best for students with different needs.

Researchers do not know what combination or how much of each of the recommended activities is needed to maximize writing instruction for adolescents in general or low-achieving writers in particular. Nor do they yet know what combination of elements works for which types of writers.

Although these viewpoints were not equally represented in the research studies included in this analysis, each is critical to understanding writing development. Finally, the recently published third edition of *Research on Composition* (Smagorinsky, 2006) provides a broad overview of the field—covering topics such as rhetoric, second language writing, multimodal composition, and home and workplace writing—and a survey of research and theory over the past 20 years (see also *Handbook of Writing Research*; MacArthur, Graham, & Fitzgerald, 2006).

With such a wide range of writing instruction practices and perspectives, this review of the literature aims not to describe the full context of the high-functioning classroom but to provide specific practices that have demonstrated effectiveness across a number of contexts—a purpose to which meta-analysis is ideally suited. For any of the practices reviewed, contexts can vary widely. For instance, they may include any grade between 4th and 12th; they may or may not be inclusive classrooms serving students with learning disabilities or writing in their second language; and they may involve teachers with very different beliefs about what good writing instruction entails. However, meta-analysis allows consideration of both the strength and consistency of a practice's effects.

A TECHNICAL NOTE ON META-ANALYSIS

What is a Meta-analysis?

Meta-analysis is a particularly powerful way of synthesizing large bodies of research, as it relies on quantitative studies and permits the calculation of **effect sizes**. The strength of meta-analysis as an approach is that it allows consideration of both the *strength* and *consistency* of a practice's effects.

What is an Effect Size?

Effect sizes report the average difference between a type of instruction and a comparison condition. They indicate the **strength** of the effect. The following guidelines make these numbers more meaningful.

0.20 = **small** or mild effect

0.50 = **medium** or moderate effect

0.80 = **large** or strong effect

Positive effect sizes mean the instruction had a positive effect on student writing.

Negative effect sizes mean the instruction had a negative effect on student writing.

Although these guidelines are commonly accepted, it is important to interpret effect sizes within the context of a given field. For instance, the National Reading Panel report (National Institute of Child Health and Human Development, 2000) found an effect size of 0.53 for phonemic awareness instruction, while effect sizes for fluency instruction ranged from 0.35 to 0.50. More research is needed to establish the range of effect sizes for writing strategies identified in the current meta-analysis.

Also, it is important to note that the large number of factors that affect adolescent literacy outcomes and the difficulty in improving writing ability render *any* significant effect meaningful.

Appendix A sets out the methodology used in the meta-analysis. **Appendix B** lists all of the categories for which four or more studies were analyzed and provides descriptive information about each study.

The Outcome of Writing Instruction

The authors followed in the footsteps of previous researchers by using writing quality as the outcome studied. Writing quality is defined here in terms of coherently organized essays

containing well-developed and pertinent ideas, supporting examples, and appropriate detail (Needels & Knapp, 1994). Writing quality was included as the primary outcome, or one of several primary outcomes, in all previous meta-analyses on procedures for teaching writing (Bangert-Drowns, 1993; Goldberg et al., 2003; Graham, 2006; Graham & Harris, 2003; Hillocks, 1986). Writing quality served as the sole outcome measure because the authors were interested in identifying treatments that had a broad impact on writing performance. The only exceptions involved studies examining the teaching of summarization, in which completeness and accuracy of summaries were assessed, and writing-to-learn studies, in which content learning was the outcome measure.

The 11 Key Elements of Adolescent Writing Instruction

Writing Strategies (Effect Size = 0.82)

Teaching adolescents strategies for planning, revising, and editing their compositions has shown a dramatic effect on the quality of students' writing. Strategy instruction involves explicitly and systematically teaching steps necessary for planning, revising, and/or editing text (Graham, 2006). The ultimate goal is to teach students to use these strategies independently.

Strategy instruction may involve teaching more generic processes, such as brainstorming (e.g.,Troia & Graham, 2002) or collaboration for peer revising (MacArthur, Schwartz, & Graham, 1991). In other instances, it involves teaching strategies for accomplishing specific types of writing tasks, such as writing a story (Fitzgerald & Markham, 1987) or a persuasive essay (Yeh, 1998).

WRITING STRATEGIES: AN EXAMPLE

Self-Regulated Strategy Development (SRSD) is an approach for helping students learn specific strategies for planning, drafting, and revising text. SRSD instruction is also characterized by explicit teaching, individualized instruction, and criterion-based versus time-based learning. Children are treated as active collaborators in the learning process. Instruction takes place in six stages:

Develop Background Knowledge: Students are taught any background knowledge needed to use the strategy successfully.

Describe It: The strategy as well as its purpose and benefits is described and discussed.

Model It: The teacher models how to use the strategy.

Memorize It: The student memorizes the steps of the strategy and any accompanying mnemonic.

Support It: The teacher supports or scaffolds student mastery of the strategy.

Independent Use: Students use the strategy with few or no supports.

Students are also taught a number of self-regulation skills (including goal setting, self-monitoring, self-instruction, and self-reinforcement) designed to help them manage writing strategies, the writing process, and their behavior. Mnemonics are introduced to help students remember strategies to increase writing performance. Two such strategies are PLAN and WRITE:

PLAN (*P*ay attention to the prompt, *L*ist the main idea, *A*dd supporting ideas, *N*umber your ideas)

WRITE (*W*ork from your plan to develop your thesis statement, *R*emember your goals, *I*nclude transition words for each paragraph, *T*ry to use different kinds of sentences, and *E*xciting, interesting, $10,000 words).

Sources: De La Paz & Graham, 2002; Harris & Graham, 1996

Whether generic or highly focused, explicitly teaching adolescents strategies for planning, revising, and/or editing has a strong impact on the quality of their writing. Writing strategy instruction has been found especially effective for adolescents who have difficulty writing, but it is also a powerful technique for adolescents in general. For example, 11 studies with low-achieving writers and 9 studies with students representing normal variation within the classroom were reviewed. The average weighted effect size for the studies with low-achieving writers (1.02) was larger than the average weighted effect size for students across the full range of ability in regular classrooms (0.70).

Self-Regulated Strategy Development (SRSD) is a particularly effective approach for teaching writing strategies. The average weighted effect size for SRSD studies (1.14) was larger than for non-SRSD studies (0.62). SRSD is characterized by explicit instruction of writing strategies and self-regulation procedures (e.g., self-assessment and goal setting), as well as individualized instruction and criterion-based learning (see box above).

Strategy instruction is well supported by research. Its effects appear to be more dramatic for lower-achieving writers than for those across the full range of ability. Although SRSD had stronger effects than most other strategy approaches, the meta-analysis indicates moderate to strong effects of writing strategy instruction in general.

Summarization (Effect Size = 0.82)

Writing instruction often involves explicitly and systematically teaching students how to summarize texts. The summarization approaches studied ranged from explicitly teaching summarization strategies to enhancing summarization by progressively "fading" models of a good summary. In fact, students can learn to write better summaries from either a rule-governed or a more intuitive approach. Overall, teaching adolescents to summarize text had a consistent, strong, positive effect on their ability to write good summaries.

Collaborative Writing (Effect Size = 0.75)

Collaborative writing involves developing instructional arrangements whereby adolescents work together to plan, draft, revise, and edit their compositions. It shows a strong impact on improving the quality of students' writing.

Studies of this approach compared its effectiveness with that of having students compose independently. The effect sizes for all studies were positive and large. Collectively, these investigations show that collaborative arrangements in which students help each other with one or more aspects of their writing have a strong positive

COLLABORATIVE WRITING: ONE APPROACH

Collaborative writing involves peers writing as a team. In one approach, a higher achieving student is assigned to be the Helper (tutor) and a lower achieving student is assigned to be the Writer (tutee). The students are instructed to work as partners on a writing task. The Helper student assists the Writer student with meaning, organization, spelling, punctuation, generating ideas, creating a draft, rereading essays, editing essays, choosing the best copy, and evaluating the final product. Throughout the intervention, the teacher's role is to monitor, prompt, and praise the students, and address their concerns.

Source: Yarrow & Topping, 2001

impact on quality. It was not possible to draw separate conclusions for low-achieving writers, as only two studies (Dailey, 1991; Macarthur et al., 1991) involved these students specifically. However, in both studies the effect size exceeded 1.00.

Specific Product Goals (Effect Size = 0.70)

Setting product goals involves assigning students specific, reachable goals for the writing they are to complete. It includes identifying the purpose of the assignment (e.g., to persuade) as well as characteristics of the final product.

SETTING SPECIFIC PRODUCT GOALS: ONE APPROACH

Setting specific product goals provides students with objectives to focus on particular aspects of their writing. For example, students may be instructed to take a position and write a persuasive letter designed to lead an audience to agree with them. In addition to this general goal, teachers provide explicit subgoals on argumentative discourse, including a statement of belief, two or three reasons for that belief, examples or supporting information for each reason, two or three reasons why others might disagree, and why those reasons are incorrect.

Source: Ferretti, MacArthur, & Dowdy, 2000

Specific goals in the studies reviewed included (a) adding more ideas to a paper when revising, or establishing a goal to write a specific kind of paper and (b) assigning goals for specific structural elements in a composition. Compared with instances in which students were simply given a general overall goal, these relatively simple procedures resulted in a positive effect size, and the average effect was strong. It was possible to obtain effect sizes specifically for low-achieving writers in three of the five product goal studies (which involved disaggregating results reported in Ferretti, MacArthur, & Dowdy, 2000). The average effect for these students was similarly strong, providing some tentative evidence that, interpreted cautiously (because of the small sample), indicates that setting product goals is effective with adolescents who are weaker writers. Overall, assigning students goals for their written product had a strong impact on writing quality.

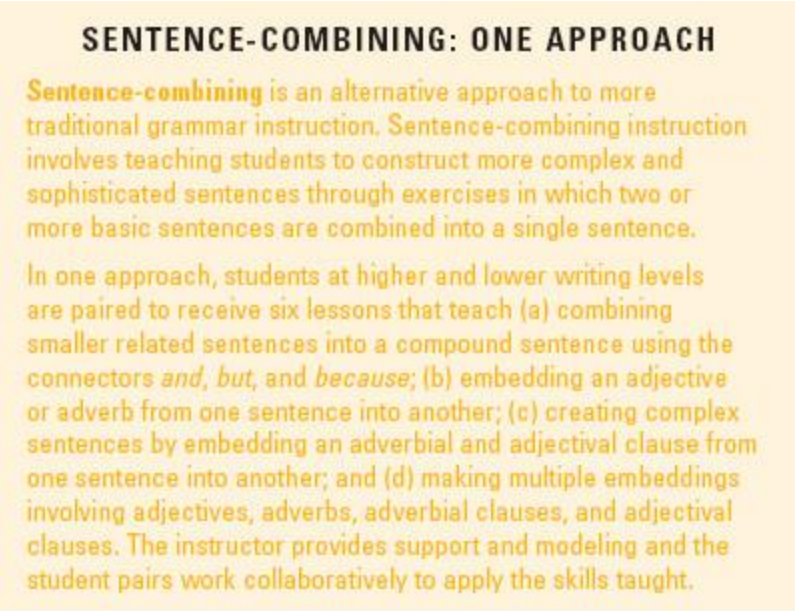
Word Processing (Effect Size = 0.55)

The use of word-processing equipment can be particularly helpful for low-achieving writers. In this type of instruction, students might work collaboratively on writing assignments using personal laptop computers, or they might learn to word-process a composition under teacher guidance. Typing text on the computer with word-processing software produces a neat and legible script. It allows the writer to add, delete, and move text easily. Word-processing software, especially in more recent studies, includes spell checkers as well.

Compared with composing by hand, the effect of word-processing instruction in most of the studies reviewed was positive, suggesting that word processing has a consistently positive impact on writing quality. The average effect on writing quality was moderate for students in general (effect size = 0.51), but for low-achieving writers it was larger (effect size = 0.70). Thus, word processing appears to be an effective instructional support for students in grades 4 to 12 and may be especially effective in enhancing the quality of text produced by low-achieving writers.

Sentence Combining (Effect Size = 0.50)

Sentence combining involves teaching students to construct more complex and sophisticated sentences through exercises in which two or more basic sentences are combined into a single sentence. Teaching adolescents how to write increasingly complex sentences in this way enhances the quality of their writing. Studies establishing the effectiveness of sentence combining primarily compared it with more traditional grammar instruction. The effect sizes for all studies were consistently positive and moderate in strength.



SENTENCE-COMBINING: ONE APPROACH

Sentence-combining is an alternative approach to more traditional grammar instruction. Sentence-combining instruction involves teaching students to construct more complex and sophisticated sentences through exercises in which two or more basic sentences are combined into a single sentence.

In one approach, students at higher and lower writing levels are paired to receive six lessons that teach (a) combining smaller related sentences into a compound sentence using the connectors *and*, *but*, and *because*; (b) embedding an adjective or adverb from one sentence into another; (c) creating complex sentences by embedding an adverbial and adjectival clause from one sentence into another; and (d) making multiple embeddings involving adjectives, adverbs, adverbial clauses, and adjectival clauses. The instructor provides support and modeling and the student pairs work collaboratively to apply the skills taught.

Only one study (Saddler & Graham, 2005) examined the effects of sentence combining on low-achieving writers. When the effects of sentence combining were disaggregated for different types of writers in this study (low-achieving and average writers), the effect size for the weaker writers was 0.46. Overall, the current analysis of sentence combining indicates that this focus of instruction has a moderate impact on improving the quality of the writing of adolescents in general.

Pre-writing (Effect Size = 0.32)

Pre-writing engages students in activities designed to help them generate or organize ideas for their composition. Engaging adolescents in such activities before they write a first draft improves the quality of their writing. Pre-writing activities include gathering possible information for a paper through reading or developing a visual representation of their ideas before sitting down to write. For example, some common pre-writing activities include encouraging group and individual planning before writing, organizing pre-writing ideas, prompting students to plan after providing a brief demonstration of how to do so, or assigning reading material pertinent to a topic and then encouraging students to plan their work in advance. It was not possible to draw separate conclusions for low-achieving writers, as all of the pre-writing studies involved students across the full range of ability in regular classrooms. Collectively, these investigations show that pre-writing activities have a positive and small to moderate impact on the quality of students' writing.

Inquiry Activities (Effect Size = 0.32)

Inquiry means engaging students in activities that help them develop ideas and content for a particular writing task by analyzing immediate, concrete data (comparing and contrasting cases or collecting and evaluating evidence). Involving adolescents in writing activities designed to sharpen their inquiry skills improves the quality of their writing. Effective inquiry activities in writing are characterized by a clearly specified goal (e.g., describe the actions of people), analysis of concrete and immediate data (observe one or more peers during specific activities), use of specific strategies to conduct the analysis (retrospectively ask the person being observed the reason for a particular action), and applying what was learned (assign the writing of a story incorporating insights from the inquiry process).

INQUIRY ACTIVITIES: AN EXAMPLE

Students examine and infer the qualities of a number of objects in order to describe them in writing. The students touch objects while wearing blindfolds, examine seashells, listen to sounds, do physical exercise, become aware of bodily sensations, examine pictures, pantomime brief scenarios, act out dialogues, and examine model compositions. Students' responses to these objects are elicited. Students list more and more precise details, and respond to each other's descriptions in small groups or whole classes under teacher guidance in order to become increasingly aware of the writing task and possible audience reactions to the written product. The students write and revise several compositions. The teacher makes comments on each draft of the composition with the intention of increasing specificity, focus, and impact of the writing.

Source: Hillocks, 1982

It was found that this type of instruction was last studied in 1986. The comparison conditions in the inquiry studies were relatively similar, primarily involving writing activities facilitated by teachers. It was not possible to draw any specific conclusions for low-achieving writers, as all of the studies involved the full range of students in a typical classroom. Despite the lack of new research, the evidence suggests that engaging students in inquiry activities in which they analyze data before writing is an effective instructional practice.

Process Writing Approach (Effect Size = 0.32)

The process writing approach involves a number of interwoven activities, including creating extended opportunities for writing; emphasizing writing for real audiences; encouraging cycles of planning, translating, and reviewing; stressing personal responsibility and ownership of writing projects; facilitating high levels of student interactions; developing supportive writing environments; encouraging self-reflection and evaluation; and offering personalized individual assistance, brief instructional lessons to meet students' individual needs, and, in some instances, more extended and systematic instruction. The overall effect of the process writing approach was small to moderate, but significant. Only three studies specifically examined the impact of the process writing approach with low-achieving writers, making it difficult to draw any conclusions about its efficacy for these students.

Explicit teacher training was a major factor in the success of the process writing approach. When teachers had such training, the effect was moderate (0.46), but in the absence of training the effect was negligible, except for students in grades four to six, where the effect size was small (0.27) but significant. Five of the six studies in which teachers received training in applying the process writing model were conducted by the National Writing Project (NWP) to provide support for its work. Additional research is needed to verify these findings, particularly as the content of NWP training has changed over time. Also, it was not always clear what teachers learned or subsequently applied in their classrooms in the NWP studies; random assignment did not occur in any of the NWP studies; NWP was a partner in much of this research; and in some instances the NWP teachers were volunteers. Nevertheless, it is interesting to note that many of the components included in a recent description of the NWP model (peers working together, inquiry, and sentence-combining; see Nagin, 2003) were found by this meta-analysis to enhance the quality of adolescents' writing.

The **process writing approach** stresses activities that emphasize extended opportunities for writing, writing for real audiences, self-reflection, personalized instruction and goals, and cycles of planning, translating, and reviewing.

Study of Models (Effect Size = 0.25)

The study of models provides adolescents with good models for each type of writing that is the focus of instruction. Students are encouraged to analyze these examples and to emulate the critical elements, patterns, and forms embodied in the models in their own writing. The effects for all six studies reviewed were positive, though small. It was not possible to draw separate conclusions for low-achieving writers, as none of the studies specifically addressed this population.

STUDY OF MODELS: AN EXAMPLE

An example of **Study of Models** involves presenting students with two models of excellent writing, such as a well-written essay that sets out to persuade the reader that UFOs exist and another well-written persuasive essay claiming that there is no such thing as a UFO. The teacher discusses the essays with the students. The next day, students are given the essay that claimed that UFOs do not exist and are asked to write a persuasive essay arguing for or against the position that girls are not better in math than are boys.

Source: Knudson, 1991

Writing for Content Area Learning (Effect Size = 0.23)

Writing has been shown to be an effective tool for enhancing students' learning of content material. Although the impact of writing activity on content learning is small, it is consistent enough to predict some enhancement in learning as a result of writing-to-learn activities.

About 75% of the writing-to-learn studies analyzed had positive effects. The average effect was small but significant. Unfortunately, it was not possible to draw separate conclusions for low-achieving writers, as none of the studies examined the impact of writing-to-learn activities specifically with these students. Writing-to-learn was equally effective for all content areas (social studies, math, and science) and grades (4–6 versus 7–12) studied.

WRITING-TO-LEARN: AN EXAMPLE

In a science class, the students study the human circulatory system. The teacher's goal is to help students develop alternative conceptualizations of the role of the heart, blood, and circulation. The science teacher asks the students to write summaries and answer questions in writing to increase their ability to explain information, elaborate knowledge leading to deeper understanding of the topic, comment on and interpret information in the written science text, communicate what has not been understood, and describe a change of belief they might be experiencing. Note that in the writing-to-learn approach, the teacher assigns writing tasks but does not provide explicit instruction in writing skills. Thus, writing is a tool of learning content material rather than an end in itself.

Source: Boscolo & Mason, 2001

A Note About Grammar Instruction

Grammar instruction in the studies reviewed involved the explicit and systematic teaching of the parts of speech and structure of sentences. The meta-analysis found an effect for this type of instruction for students across the full range of ability, but surprisingly, this effect was negative. This negative effect was small, but it was statistically significant, indicating that traditional grammar instruction is unlikely to help improve the quality of students' writing. Studies specifically examining the impact of grammar instruction with low-achieving writers also yielded negative results (Anderson, 1997; Saddler & Graham, 2005). Such findings raise serious questions about some educators' enthusiasm for traditional grammar instruction as a focus of writing instruction for adolescents. However, other instructional methods, such as sentence combining, provide an effective alternative to traditional grammar instruction, as this approach improves students' writing quality while at the same time enhancing syntactic skills. In addition, a recent study (Fearn & Farnan, 2005) found that teaching students to focus on the function and practical application of grammar within the context of writing (versus teaching grammar as an independent activity) produced strong and positive effects on students' writing. Overall, the findings on grammar instruction suggest that, although teaching grammar is important, alternative procedures, such as sentence combining, are more effective than traditional approaches for improving the quality of students' writing.

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Develop Background Knowledge: Students are taught any background knowledge needed to use the strategy successfully.

Describe It: The strategy as well as its purpose and benefits is described and discussed.

Model It: The teacher models how to use the strategy.

Memorize It: The student memorizes the steps of the strategy and any accompanying mnemonic.

Support It: The teacher supports or scaffolds student mastery of the strategy.

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Students are also taught a number of self-regulation skills (including goal setting, self-monitoring, self-instruction, and self-reinforcement) designed to help them manage writing strategies, the writing process, and their behavior. Mnemonics are introduced to help students remember strategies to increase writing performance. Two such strategies are PLAN and WRITE:

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Strategy instruction is well supported by research. Its effects appear to be more dramatic for lower-achieving writers than for those across the full range of ability. Although SRSD had stronger effects than most other strategy approaches, the meta-analysis indicates moderate to strong effects of writing strategy instruction in general.

Summarization (Effect Size = 0.82)

Writing instruction often involves explicitly and systematically teaching students how to summarize texts. The summarization approaches studied ranged from explicitly teaching summarization strategies to enhancing summarization by progressively "fading" models of a good summary. In fact, students can learn to write better summaries from either a rule-governed or a more intuitive approach. Overall, teaching adolescents to summarize text had a consistent, strong, positive effect on their ability to write good summaries.

Collaborative Writing (Effect Size = 0.75)

Collaborative writing involves developing instructional arrangements whereby adolescents work together to plan, draft, revise, and edit their compositions. It shows a strong impact on improving the quality of students' writing.

Studies of this approach compared its effectiveness with that of having students compose independently. The effect sizes for all studies were positive and large. Collectively, these investigations show that collaborative arrangements in which students help each other with one or more aspects of their writing have a strong positive

COLLABORATIVE WRITING: ONE APPROACH

Collaborative writing involves peers writing as a team. In one approach, a higher achieving student is assigned to be the Helper (tutor) and a lower achieving student is assigned to be the Writer (tutee). The students are instructed to work as partners on a writing task. The Helper student assists the Writer student with meaning, organization, spelling, punctuation, generating ideas, creating a draft, rereading essays, editing essays, choosing the best copy, and evaluating the final product. Throughout the intervention, the teacher's role is to monitor, prompt, and praise the students, and address their concerns.

Source: Yarrow & Topping, 2001

impact on quality. It was not possible to draw separate conclusions for low-achieving writers, as only two studies (Dailey, 1991; Macarthur et al., 1991) involved these students specifically. However, in both studies the effect size exceeded 1.00.

Specific Product Goals (Effect Size = 0.70)

Setting product goals involves assigning students specific, reachable goals for the writing they are to complete. It includes identifying the purpose of the assignment (e.g., to persuade) as well as characteristics of the final product.

SETTING SPECIFIC PRODUCT GOALS: ONE APPROACH

Setting specific product goals provides students with objectives to focus on particular aspects of their writing. For example, students may be instructed to take a position and write a persuasive letter designed to lead an audience to agree with them. In addition to this general goal, teachers provide explicit subgoals on argumentative discourse, including a statement of belief, two or three reasons for that belief, examples or supporting information for each reason, two or three reasons why others might disagree, and why those reasons are incorrect.

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Specific goals in the studies reviewed included (a) adding more ideas to a paper when revising, or establishing a goal to write a specific kind of paper and (b) assigning goals for specific structural elements in a composition. Compared with instances in which students were simply given a general overall goal, these relatively simple procedures resulted in a positive effect size, and the average effect was strong. It was possible to obtain effect sizes specifically for low-achieving writers in three of the five product goal studies (which involved disaggregating results reported in Ferretti, MacArthur, & Dowdy, 2000). The average effect for these students was similarly strong, providing some tentative evidence that, interpreted cautiously (because of the small sample), indicates that setting product goals is effective with adolescents who are weaker writers. Overall, assigning students goals for their written product had a strong impact on writing quality.

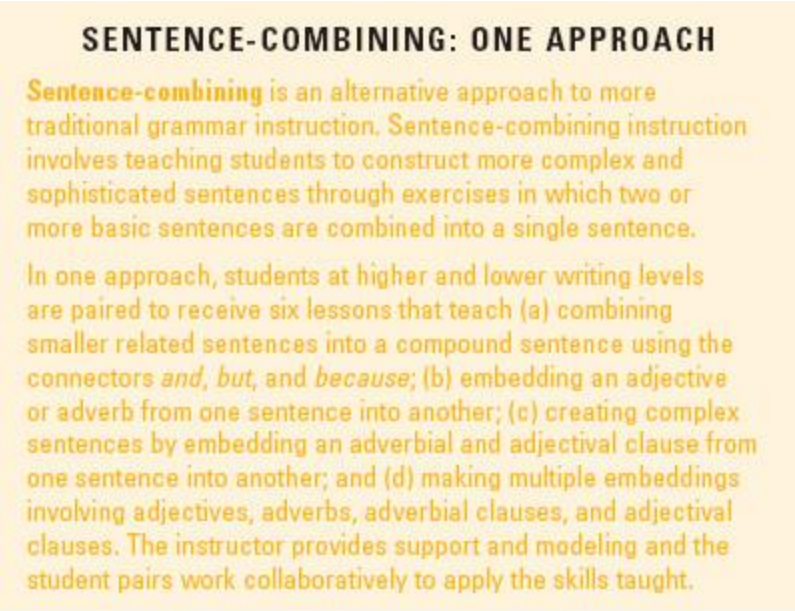
Word Processing (Effect Size = 0.55)

The use of word-processing equipment can be particularly helpful for low-achieving writers. In this type of instruction, students might work collaboratively on writing assignments using personal laptop computers, or they might learn to word-process a composition under teacher guidance. Typing text on the computer with word-processing software produces a neat and legible script. It allows the writer to add, delete, and move text easily. Word-processing software, especially in more recent studies, includes spell checkers as well.

Compared with composing by hand, the effect of word-processing instruction in most of the studies reviewed was positive, suggesting that word processing has a consistently positive impact on writing quality. The average effect on writing quality was moderate for students in general (effect size = 0.51), but for low-achieving writers it was larger (effect size = 0.70). Thus, word processing appears to be an effective instructional support for students in grades 4 to 12 and may be especially effective in enhancing the quality of text produced by low-achieving writers.

Sentence Combining (Effect Size = 0.50)

Sentence combining involves teaching students to construct more complex and sophisticated sentences through exercises in which two or more basic sentences are combined into a single sentence. Teaching adolescents how to write increasingly complex sentences in this way enhances the quality of their writing. Studies establishing the effectiveness of sentence combining primarily compared it with more traditional grammar instruction. The effect sizes for all studies were consistently positive and moderate in strength.



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Only one study (Saddler & Graham, 2005) examined the effects of sentence combining on low-achieving writers. When the effects of sentence combining were disaggregated for different types of writers in this study (low-achieving and average writers), the effect size for the weaker writers was 0.46. Overall, the current analysis of sentence combining indicates that this focus of instruction has a moderate impact on improving the quality of the writing of adolescents in general.

Pre-writing (Effect Size = 0.32)

Pre-writing engages students in activities designed to help them generate or organize ideas for their composition. Engaging adolescents in such activities before they write a first draft improves the quality of their writing. Pre-writing activities include gathering possible information for a paper through reading or developing a visual representation of their ideas before sitting down to write. For example, some common pre-writing activities include encouraging group and individual planning before writing, organizing pre-writing ideas, prompting students to plan after providing a brief demonstration of how to do so, or assigning reading material pertinent to a topic and then encouraging students to plan their work in advance. It was not possible to draw separate conclusions for low-achieving writers, as all of the pre-writing studies involved students across the full range of ability in regular classrooms. Collectively, these investigations show that pre-writing activities have a positive and small to moderate impact on the quality of students' writing.

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Inquiry means engaging students in activities that help them develop ideas and content for a particular writing task by analyzing immediate, concrete data (comparing and contrasting cases or collecting and evaluating evidence). Involving adolescents in writing activities designed to sharpen their inquiry skills improves the quality of their writing. Effective inquiry activities in writing are characterized by a clearly specified goal (e.g., describe the actions of people), analysis of concrete and immediate data (observe one or more peers during specific activities), use of specific strategies to conduct the analysis (retrospectively ask the person being observed the reason for a particular action), and applying what was learned (assign the writing of a story incorporating insights from the inquiry process).

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Students examine and infer the qualities of a number of objects in order to describe them in writing. The students touch objects while wearing blindfolds, examine seashells, listen to sounds, do physical exercise, become aware of bodily sensations, examine pictures, pantomime brief scenarios, act out dialogues, and examine model compositions. Students' responses to these objects are elicited. Students list more and more precise details, and respond to each other's descriptions in small groups or whole classes under teacher guidance in order to become increasingly aware of the writing task and possible audience reactions to the written product. The students write and revise several compositions. The teacher makes comments on each draft of the composition with the intention of increasing specificity, focus, and impact of the writing.

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It was found that this type of instruction was last studied in 1986. The comparison conditions in the inquiry studies were relatively similar, primarily involving writing activities facilitated by teachers. It was not possible to draw any specific conclusions for low-achieving writers, as all of the studies involved the full range of students in a typical classroom. Despite the lack of new research, the evidence suggests that engaging students in inquiry activities in which they analyze data before writing is an effective instructional practice.

Process Writing Approach (Effect Size = 0.32)

The process writing approach involves a number of interwoven activities, including creating extended opportunities for writing; emphasizing writing for real audiences; encouraging cycles of planning, translating, and reviewing; stressing personal responsibility and ownership of writing projects; facilitating high levels of student interactions; developing supportive writing environments; encouraging self-reflection and evaluation; and offering personalized individual assistance, brief instructional lessons to meet students' individual needs, and, in some instances, more extended and systematic instruction. The overall effect of the process writing approach was small to moderate, but significant. Only three studies specifically examined the impact of the process writing approach with low-achieving writers, making it difficult to draw any conclusions about its efficacy for these students.

Explicit teacher training was a major factor in the success of the process writing approach. When teachers had such training, the effect was moderate (0.46), but in the absence of training the effect was negligible, except for students in grades four to six, where the effect size was small (0.27) but significant. Five of the six studies in which teachers received training in applying the process writing model were conducted by the National Writing Project (NWP) to provide support for its work. Additional research is needed to verify these findings, particularly as the content of NWP training has changed over time. Also, it was not always clear what teachers learned or subsequently applied in their classrooms in the NWP studies; random assignment did not occur in any of the NWP studies; NWP was a partner in much of this research; and in some instances the NWP teachers were volunteers. Nevertheless, it is interesting to note that many of the components included in a recent description of the NWP model (peers working together, inquiry, and sentence-combining; see Nagin, 2003) were found by this meta-analysis to enhance the quality of adolescents' writing.

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The study of models provides adolescents with good models for each type of writing that is the focus of instruction. Students are encouraged to analyze these examples and to emulate the critical elements, patterns, and forms embodied in the models in their own writing. The effects for all six studies reviewed were positive, though small. It was not possible to draw separate conclusions for low-achieving writers, as none of the studies specifically addressed this population.

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An example of **Study of Models** involves presenting students with two models of excellent writing, such as a well-written essay that sets out to persuade the reader that UFOs exist and another well-written persuasive essay claiming that there is no such thing as a UFO. The teacher discusses the essays with the students. The next day, students are given the essay that claimed that UFOs do not exist and are asked to write a persuasive essay arguing for or against the position that girls are not better in math than are boys.

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Writing has been shown to be an effective tool for enhancing students' learning of content material. Although the impact of writing activity on content learning is small, it is consistent enough to predict some enhancement in learning as a result of writing-to-learn activities.

About 75% of the writing-to-learn studies analyzed had positive effects. The average effect was small but significant. Unfortunately, it was not possible to draw separate conclusions for low-achieving writers, as none of the studies examined the impact of writing-to-learn activities specifically with these students. Writing-to-learn was equally effective for all content areas (social studies, math, and science) and grades (4–6 versus 7–12) studied.

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In a science class, the students study the human circulatory system. The teacher's goal is to help students develop alternative conceptualizations of the role of the heart, blood, and circulation. The science teacher asks the students to write summaries and answer questions in writing to increase their ability to explain information, elaborate knowledge leading to deeper understanding of the topic, comment on and interpret information in the written science text, communicate what has not been understood, and describe a change of belief they might be experiencing. Note that in the writing-to-learn approach, the teacher assigns writing tasks but does not provide explicit instruction in writing skills. Thus, writing is a tool of learning content material rather than an end in itself.

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A Note About Grammar Instruction

Grammar instruction in the studies reviewed involved the explicit and systematic teaching of the parts of speech and structure of sentences. The meta-analysis found an effect for this type of instruction for students across the full range of ability, but surprisingly, this effect was negative. This negative effect was small, but it was statistically significant, indicating that traditional grammar instruction is unlikely to help improve the quality of students' writing. Studies specifically examining the impact of grammar instruction with low-achieving writers also yielded negative results (Anderson, 1997; Saddler & Graham, 2005). Such findings raise serious questions about some educators' enthusiasm for traditional grammar instruction as a focus of writing instruction for adolescents. However, other instructional methods, such as sentence combining, provide an effective alternative to traditional grammar instruction, as this approach improves students' writing quality while at the same time enhancing syntactic skills. In addition, a recent study (Fearn & Farnan, 2005) found that teaching students to focus on the function and practical application of grammar within the context of writing (versus teaching grammar as an independent activity) produced strong and positive effects on students' writing. Overall, the findings on grammar instruction suggest that, although teaching grammar is important, alternative procedures, such as sentence combining, are more effective than traditional approaches for improving the quality of students' writing.

back

The Outcome of Writing Instruction

The authors followed in the footsteps of previous researchers by using writing quality as the outcome studied. Writing quality is defined here in terms of coherently organized essays containing well-developed and pertinent ideas, supporting examples, and appropriate detail (Needels & Knapp, 1994). Writing quality was included as the primary outcome, or one of several primary outcomes, in all previous meta-analyses on

procedures for teaching writing (Bangert-Drowns, 1993; Goldberg et al., 2003; Graham, 2006; Graham & Harris, 2003; Hillocks, 1986). Writing quality served as the sole outcome measure because the authors were interested in identifying treatments that had a broad impact on writing performance. The only exceptions involved studies examining the teaching of summarization, in which completeness and accuracy of summaries were assessed, and writing-to-learn studies, in which content learning was the outcome measure.

The 11 Key Elements of Adolescent Writing Instruction

Writing Strategies (Effect Size = 0.82)

Teaching adolescents strategies for planning, revising, and editing their compositions has shown a dramatic effect on the quality of students' writing. Strategy instruction involves explicitly and systematically teaching steps necessary for planning, revising, and/or editing text (Graham, 2006). The ultimate goal is to teach students to use these strategies independently.

Strategy instruction may involve teaching more generic processes, such as brainstorming (e.g.,Troia & Graham, 2002) or collaboration for peer revising (MacArthur, Schwartz, & Graham, 1991). In other instances, it involves teaching strategies for accomplishing specific types of writing tasks, such as writing a story (Fitzgerald & Markham, 1987) or a persuasive essay (Yeh, 1998). Whether generic or highly focused, explicitly teaching adolescents strategies for planning, revising, and/or editing

WRITING STRATEGIES: AN EXAMPLE

Self-Regulated Strategy Development (SRSD) is an approach for helping students learn specific strategies for planning, drafting, and revising text. SRSD instruction is also characterized by explicit teaching, individualized instruction, and criterion-based versus time-based learning. Children are treated as active collaborators in the learning process. Instruction takes place in six stages:

Develop Background Knowledge: Students are taught any background knowledge needed to use the strategy successfully.

Describe It: The strategy as well as its purpose and benefits is described and discussed.

Model It: The teacher models how to use the strategy.

Memorize It: The student memorizes the steps of the strategy and any accompanying mnemonic.

Support It: The teacher supports or scaffolds student mastery of the strategy.

Independent Use: Students use the strategy with few or no supports.

Students are also taught a number of self-regulation skills (including goal setting, self-monitoring, self-instruction, and self-reinforcement) designed to help them manage writing strategies, the writing process, and their behavior. Mnemonics are introduced to help students remember strategies to increase writing performance. Two such strategies are PLAN and WRITE:

PLAN (*P*ay attention to the prompt, *L*ist the main idea, *A*dd supporting ideas, *N*umber your ideas)

WRITE (*W*ork from your plan to develop your thesis statement, *R*emember your goals, *I*nclude transition words for each paragraph, *T*ry to use different kinds of sentences, and *E*xciting, interesting, $10,000 words).

Sources: De La Paz & Graham, 2002; Harris & Graham, 1996

has a strong impact on the quality of their writing. Writing strategy instruction has been found especially effective for adolescents who have difficulty writing, but it is also a powerful technique for adolescents in general. For example, 11 studies with low-achieving writers and 9 studies with students representing normal variation within the classroom were reviewed. The average weighted effect size for the studies with low-achieving writers (1.02) was larger than the average weighted effect size for students across the full range of ability in regular classrooms (0.70).

Self-Regulated Strategy Development (SRSD) is a particularly effective approach for teaching writing strategies. The average weighted effect size for SRSD studies (1.14) was larger than for non-SRSD studies (0.62). SRSD is characterized by explicit instruction of writing strategies and self-regulation procedures (e.g., self-assessment and goal setting), as well as individualized instruction and criterion-based learning (see box above).

Strategy instruction is well supported by research. Its effects appear to be more dramatic for lower-achieving writers than for those across the full range of ability. Although SRSD had stronger effects than most other strategy approaches, the meta-analysis indicates moderate to strong effects of writing strategy instruction in general.

Summarization (Effect Size = 0.82)

Writing instruction often involves explicitly and systematically teaching students how to summarize texts. The summarization approaches studied ranged from explicitly teaching summarization strategies to enhancing summarization by progressively "fading" models of a good summary. In fact, students can learn to write better summaries from either a rule-governed or a more intuitive approach. Overall, teaching adolescents to summarize text had a consistent, strong, positive effect on their ability to write good summaries.

Collaborative Writing (Effect Size = 0.75)

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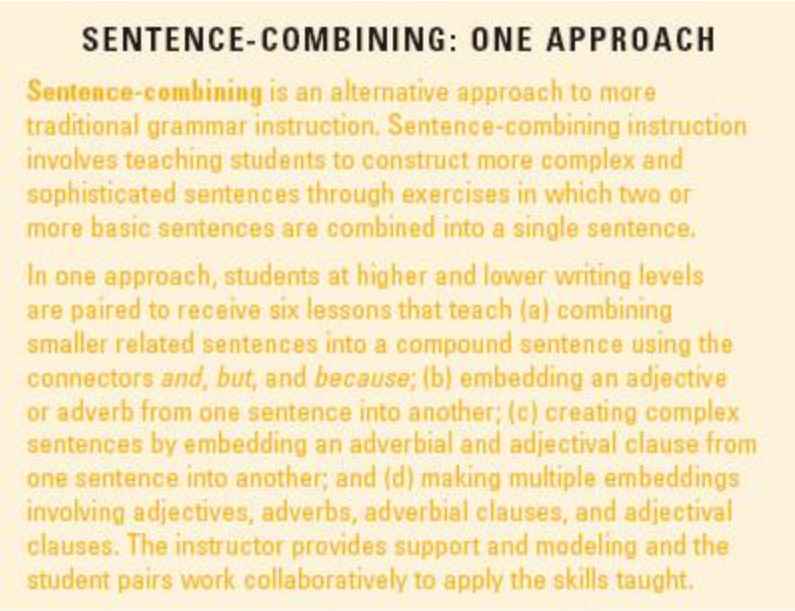

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back

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Word Processing (Effect Size = 0.55)

The use of word-processing equipment can be particularly helpful for low-achieving writers. In this type of instruction, students might work collaboratively on writing assignments using personal laptop computers, or they might learn to word-process a composition under teacher guidance. Typing text on the computer with word-processing software produces a neat and legible script. It allows the writer to add, delete, and move text easily. Word-processing software, especially in more recent studies, includes spell checkers as well.

Compared with composing by hand, the effect of word-processing instruction in most of the studies reviewed was positive, suggesting that word processing has a consistently positive impact on writing quality. The average effect on writing quality was moderate for students in general (effect size = 0.51), but for low-achieving writers it was larger (effect size = 0.70). Thus, word processing appears to be an effective instructional support for students in grades 4 to 12 and may be especially effective in enhancing the quality of text produced by low-achieving writers.

Sentence Combining (Effect Size = 0.50)

Sentence combining involves teaching students to construct more complex and sophisticated sentences through exercises in which two or more basic sentences are combined into a single sentence. Teaching adolescents how to write increasingly complex sentences in this way enhances the quality of their writing. Studies establishing the effectiveness of sentence combining primarily compared it with more traditional grammar instruction. The effect sizes for all studies were consistently positive and moderate in strength.

SENTENCE-COMBINING: ONE APPROACH

Sentence-combining is an alternative approach to more traditional grammar instruction. Sentence-combining instruction involves teaching students to construct more complex and sophisticated sentences through exercises in which two or more basic sentences are combined into a single sentence.

In one approach, students at higher and lower writing levels are paired to receive six lessons that teach (a) combining smaller related sentences into a compound sentence using the connectors *and*, *but*, and *because*; (b) embedding an adjective or adverb from one sentence into another; (c) creating complex sentences by embedding an adverbial and adjectival clause from one sentence into another; and (d) making multiple embeddings involving adjectives, adverbs, adverbial clauses, and adjectival clauses. The instructor provides support and modeling and the student pairs work collaboratively to apply the skills taught.

Only one study (Saddler & Graham, 2005) examined the effects of sentence combining on low-achieving writers. When the effects of sentence combining were disaggregated for different types of writers in this study (low-achieving and average writers), the effect size for the weaker writers was 0.46. Overall, the current analysis of sentence combining indicates that this focus of instruction has a moderate impact on improving the quality of the writing of adolescents in general.

Pre-writing (Effect Size = 0.32)

Pre-writing engages students in activities designed to help them generate or organize ideas for their

composition. Engaging adolescents in such activities before they write a first draft improves the quality of their writing. Pre-writing activities include gathering possible information for a paper through reading or developing a visual representation of their ideas before sitting down to write. For example, some common pre-writing activities include encouraging group and individual planning before writing, organizing pre-writing ideas, prompting students to plan after providing a brief demonstration of how to do so, or assigning reading material pertinent to a topic and then encouraging students to plan their work in advance. It was not possible to draw separate conclusions for low-achieving writers, as all of the pre-writing studies involved students across the full range of ability in regular classrooms. Collectively, these investigations show that pre-writing activities have a positive and small to moderate impact on the quality of students' writing.

Inquiry Activities (Effect Size = 0.32)

Inquiry means engaging students in activities that help them develop ideas and content for a particular writing task by analyzing immediate, concrete data (comparing and contrasting cases or collecting and evaluating evidence). Involving adolescents in writing activities designed to sharpen their inquiry skills improves the quality of their writing. Effective inquiry activities in writing are characterized by a clearly specified goal (e.g., describe the actions of people), analysis of concrete and immediate data (observe one or more peers during specific activities), use of specific strategies to conduct the analysis (retrospectively ask the person being observed the reason for a particular action), and applying what was learned (assign the writing of a story incorporating insights from the inquiry process).

INQUIRY ACTIVITIES: AN EXAMPLE

Students examine and infer the qualities of a number of objects in order to describe them in writing. The students touch objects while wearing blindfolds, examine seashells, listen to sounds, do physical exercise, become aware of bodily sensations, examine pictures, pantomime brief scenarios, act out dialogues, and examine model compositions. Students' responses to these objects are elicited. Students list more and more precise details, and respond to each other's descriptions in small groups or whole classes under teacher guidance in order to become increasingly aware of the writing task and possible audience reactions to the written product. The students write and revise several compositions. The teacher makes comments on each draft of the composition with the intention of increasing specificity, focus, and impact of the writing.

Source: Hillocks, 1982

It was found that this type of instruction was last studied in 1986. The comparison conditions in the inquiry studies were relatively similar, primarily involving writing activities facilitated by teachers. It was not possible to draw any specific conclusions for low-achieving writers, as all of the studies involved the full range of students in a typical classroom. Despite the lack of new research, the evidence suggests that engaging students in inquiry activities in which they analyze data before writing is an effective instructional practice.

Process Writing Approach (Effect Size = 0.32)

The process writing approach involves a number of interwoven activities, including creating extended opportunities for writing; emphasizing writing for real audiences; encouraging cycles of planning, translating, and reviewing; stressing personal responsibility and ownership of writing projects; facilitating high levels of student interactions; developing supportive writing environments; encouraging self-reflection and evaluation; and offering personalized individual assistance, brief instructional lessons to meet students' individual

needs, and, in some instances, more extended and systematic instruction. The overall effect of the process writing approach was small to moderate, but significant. Only three studies specifically examined the impact of the process writing approach with low-achieving writers, making it difficult to draw any conclusions about its efficacy for these students.

Explicit teacher training was a major factor in the success of the process writing approach. When teachers had such training, the effect was moderate (0.46), but in the absence of training the effect was negligible, except for students in grades four to six, where the effect size was small (0.27) but significant. Five of the six studies in which teachers received training in applying the process writing model were conducted by the National Writing Project (NWP) to provide support for its work. Additional research is needed to verify these findings, particularly as the content of NWP training has changed over time. Also, it was not always clear what teachers learned or subsequently applied in their classrooms in the NWP studies; random assignment did not occur in any of the NWP studies; NWP was a partner in much of this research; and in some instances the NWP teachers were volunteers. Nevertheless, it is interesting to note that many of the components included in a recent description of the NWP model (peers working together, inquiry, and sentence-combining; see Nagin, 2003) were found by this meta-analysis to enhance the quality of adolescents' writing.

The **process writing approach** stresses activities that emphasize extended opportunities for writing, writing for real audiences, self-reflection, personalized instruction and goals, and cycles of planning, translating, and reviewing.

Study of Models (Effect Size = 0.25)

The study of models provides adolescents with good models for each type of writing that is the focus of instruction. Students are encouraged to analyze these examples and to emulate the critical elements, patterns, and forms embodied in the models in their own writing. The effects for all six studies reviewed were positive, though small. It was not possible to draw separate conclusions for low-achieving writers, as none of the studies specifically addressed this population.

STUDY OF MODELS: AN EXAMPLE

An example of **Study of Models** involves presenting students with two models of excellent writing, such as a well-written essay that sets out to persuade the reader that UFOs exist and another well-written persuasive essay claiming that there is no such thing as a UFO. The teacher discusses the essays with the students. The next day, students are given the essay that claimed that UFOs do not exist and are asked to write a persuasive essay arguing for or against the position that girls are not better in math than are boys.

Source: Knudson, 1991

Writing for Content Area Learning (Effect Size = 0.23)

Writing has been shown to be an effective tool for enhancing students' learning of content material. Although the impact of writing activity on content learning is small, it is consistent enough to predict some enhancement in learning as a result of writing-to-learn activities.

About 75% of the writing-to-learn studies analyzed had positive effects. The average effect was small but

significant. Unfortunately, it was not possible to draw separate conclusions for low-achieving writers, as none of the studies examined the impact of writing-to-learn activities specifically with these students. Writing-to-learn was equally effective for all content areas (social studies, math, and science) and grades (4–6 versus 7–12) studied.

WRITING-TO-LEARN: AN EXAMPLE

In a science class, the students study the human circulatory system. The teacher's goal is to help students develop alternative conceptualizations of the role of the heart, blood, and circulation. The science teacher asks the students to write summaries and answer questions in writing to increase their ability to explain information, elaborate knowledge leading to deeper understanding of the topic, comment on and interpret information in the written science text, communicate what has not been understood, and describe a change of belief they might be experiencing. Note that in the writing-to-learn approach, the teacher assigns writing tasks but does not provide explicit instruction in writing skills. Thus, writing is a tool of learning content material rather than an end in itself.

Source: Boscolo & Mason, 2001

A Note About Grammar Instruction

Grammar instruction in the studies reviewed involved the explicit and systematic teaching of the parts of speech and structure of sentences. The meta-analysis found an effect for this type of instruction for students across the full range of ability, but surprisingly, this effect was negative. This negative effect was small, but it was statistically significant, indicating that traditional grammar instruction is unlikely to help improve the quality of students' writing. Studies specifically examining the impact of grammar instruction with low-achieving writers also yielded negative results (Anderson, 1997; Saddler & Graham, 2005). Such findings raise serious questions about some educators' enthusiasm for traditional grammar instruction as a focus of writing instruction for adolescents. However, other instructional methods, such as sentence combining, provide an effective alternative to traditional grammar instruction, as this approach improves students' writing quality while at the same time enhancing syntactic skills. In addition, a recent study (Fearn & Farnan, 2005) found that teaching students to focus on the function and practical application of grammar within the context of writing (versus teaching grammar as an independent activity) produced strong and positive effects on students' writing. Overall, the findings on grammar instruction suggest that, although teaching grammar is important, alternative procedures, such as sentence combining, are more effective than traditional approaches for improving the quality of students' writing.

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