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Review

Teaching students with intellectual or developmental disabilities to write: A review of the literature

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Abstract

The purpose of this review was to identify effective methods for teaching writing to students with intellectual disabilities. After criteria were established, database searches and hand searches of selected peer-reviewed journals were conducted. Findings revealed a relatively small number of studies that met the criteria for inclusion. Participants, settings, research designs, independent variables, dependent variables, and results are synthesized across studies. Writing instruction effects on various written expression outcomes were aggregated by averaging percentage of non-overlapping data (PND) across studies. Findings revealed that strategy instruction was investigated more frequently than other types of approaches. Strategy instruction was consistently found to be very effective for teaching writing skills to students with intellectual disabilities. Limitations, directions for future research, and implications for practice are discussed.

Keywords: Written expression; Intellectual disabilities; Instruction

Contents

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No Child Left Behind legislation stipulates that schools are responsible for academic learning of all children, including children with special needs (No Child Left Behind Act, 2001). Over at least the last 10 years, public educators have put concerted effort into modifying their curriculum so that it contains a scope and sequence of skills that are aimed at meeting local, state, and national benchmark standards of academic achievement. This has been particularly the case with literacy as there are a significant number of illiterate adults who have not earned a high school diploma or the equivalent (Lasater & Elliot, 2004). Within the area of literacy, the focus of research and practice has primarily been in helping students develop reading skills. However, literacy encompasses more than the fundamental skill of reading; it also includes the critical skill of written expression.

According to Clay (1975), young children emerge as writers when they scribble, draw symbols, and make recurring marks on paper (e.g., repeating loops resembling a cursive lowercase ''l''). She observed that eventually children progress from forming letters and words through spelling and spontaneous writing activities to writing purposeful compositions when conventions of written language are acquired.

Often, the demands of school curricular require students to make written responses when demonstrating their knowledge about various content areas. For instance, most examinations and other types of independent seatwork require written responses. However, the need to acquire writing skills serves functions that go beyond formal schooling requirements. For example, written expression is a major form of communication in a technological society; writing emails, texting, and web-based messaging have increasingly become just as common as talking on the telephone and may even, for the most part, replace telephone messaging in and outside of the workplace. Thus, written communication facilitates inclusion within the social mainstream (Deatline-Buchman & Jitendra, 2006).

Although the demand for acquiring adequate written communication skills has increased in our advanced technological society, students are not getting adequate instruction in written expression. Proficiency in written expression requires mastery and integration of a myriad of skills, such as ideation, vocabulary, organization of thoughts, knowledge of text structures, self-regulation, spelling, grammar, and punctuation (Bui, Schumaker, & Deshler, 2006). Because written expression is a complex process and students do not develop it naturally, teachers struggle with how to best facilitate their students' execution of the writing process (Graham & Harris, 1997). Moreover, writing instruction may not be a high priority in the general education classroom because teachers are required to be accountable for their students' adequate yearly progress in reading, math, and science, however, not for students' writing (NCLB, 2001).

Students with disabilities are provided with even fewer opportunities to learn written expression skills during their formal schooling years in contrast to their peers without disabilities

(Berninger et al., 1998; Erickson, Koppenhaver, & Yoder, 1994). The differences between students with disabilities and their same age peers without disabilities can be observed both in their writing quality and quantity as well as their knowledge of various text genres (Graham & Harris, 1997).

Among individuals with disabilities, more attention in research and practice has been focused on developing the writing skills of children and adolescents who have specific learning disabilities (Gersten & Baker, 2001; Newcomer & Barenbaum, 1991). Most pupils, including those who have been identified with learning disabilities, learn to read and write in their early formal schooling years. However, students with intellectual or developmental disabilities are primarily learning daily living, social, and prevocational skills (Dever, 1990). Although not abundant, there is more research on teaching basic reading skills to students with intellectual and other developmental disabilities (see Browder, Wakeman, Spooner, Ahlgrim-Delzell, & Algozzine, 2006 for a review) in contrast to the scant research and resources available for assisting instructors on how to teach basic written expression skills to students with intellectual and other developmental disabilities. This has been the case even though technological tools (i.e., multimedia, word processing, desktop publishing) make it more possible for these individuals to express themselves in writing (Strum, 2000).

There are some characteristics that are generally associated with intellectual disabilities that make teaching written communication skills a challenge. Individuals with intellectual disabilities tend to acquire skills at a slower rate and have difficulty using strategies such as rehearsing, conceptualizing (e.g., generating new ideas or connecting sets of ideas to previous experiences), transferring, planning, organizing, and monitoring (Arabsolghar & Elkins, 2000; Banikowski & Mehring, 1999; Turner, Dofny, & Dutka, 1994). These skills may be improved by interacting with written language (Kaderavek & Rabidoux, 2004). In fact, despite challenges that individuals with intellectual disabilities face, there have been case studies and other research that suggest that individuals with intellectual disabilities can learn to express themselves rather successfully through various forms of writing (e.g., Kaderavek & Rabidoux, 2004; Kahn-Freedman, 2001; Pershey & Gilbert, 2002). However, there has not been a report synthesizing the various types of writing instruction that have been shown to be effective for students with intellectual disabilities. With respect to Yin's (1989) arguments for conducting literature reviews even if a small amount were presumably found, we conducted a review of the effectiveness of types of writing instruction on the writing performance of students with intellectual disabilities. The following aims guided our efforts: (a) to determine the quantity and quality of studies that have been conducted, (b) to discover what has been shown to be effective in an effort to make recommendations for practitioners, and (c) to generate insights and form questions for future researchers to address.

1. Method

Studies on teaching writing to students with intellectual disabilities that were included in this review met specified criteria. The following provides a list of criteria that were used to guide the selection of studies published in refereed journals from 1986 to 2007 (past 20 years).

1. Studies included participants who were identified with intellectual disabilities (IQ 75 and below). This included individuals with autism if they also had IQs of 75 or below. Additionally, if authors reported that participants were being served under the Individuals With Disabilities Education Improvement Act category of "mental retardation," we included them even if IQs were not reported.

2. Studies examined the effects of writing instruction. We defined writing instruction as teaching students to express ideas in written form. This included combining words into sentences, even if those words were simply selected by the student rather than typed or handwritten (e.g., Yamamoto & Miya, 1999). However, if the instruction focused solely on labeling objects or actions, we did not include that study. For example, Eikeseth and Jahr (2001) conducted a study to teach "writing" but broadly defined writing to include picture-labeling tasks. Therefore, we did not include this study. We also excluded studies that focused exclusively on handwriting and/or spelling instruction.
3. Investigations consisted of dependent variable measures that assessed written expression outcomes. Other dependent measures (e.g., reading skills) could also be included as long as they were coupled with some type of written expression outcome.
4. Investigations involved true experimental, quasi-experimental, or single-subject experimental designs in which the independent variable (i.e., written expression instructional method, technique, procedure, or program) was manipulated in some way to determine whether changes in a dependent variable occurred.

The process of searching for investigations that met the criteria consisted of three steps. First, a thorough computer database search from 1986 to 2007 was completed using ERIC, Educational Abstracts, Educational Research Complete, and PsychINFO. The following descriptors (listed in alphabetical order here) were used to conduct the database search: *cognitive disability*, *composition*, *developmental delay*, *developmental disability*, *essay*, *expository*, *intellectual disabilities*, *literacy*, *mental retardation*, *paragraph*, *sentence*, *writing skills*, *written communication*, and *written expression*. The second step involved a manual search of the journals that were found through the database search as well as other journals in special education and related disciplines. The following journals (listed in alphabetical order) were hand searched (also from 1986 to 2007): *American Journal of Mental Deficiency*, *American Journal on Mental Retardation*; *Education and Training in Developmental Disabilities*; *Education and Treatment of Children*; *Exceptional Children*; *Focus on Autism and Other Developmental Disabilities*; *International Journal of Disability, Development and Education*; *Journal of Applied Behavior Analysis*; *Journal of Behavioral Education*; *Journal of Communication Disorders*; *Journal of Intellectual and Developmental Disability*; *Journal of Special Education*; *Mental Retardation*; *Remedial and Special Education*; *Research and Practice for Persons with Severe Disabilities*; and *Research in Developmental Disabilities.* Lastly, an ancestral search was conducted using articles that met the selection criteria and were derived from the database and hand searches.

1.1. Procedures for descriptive review

Each of the authors read half of the studies that were included and recorded information on gender, age, disability, and ethnicity of participants; settings; research designs; dependent variables; independent variables; and results. Interobserver agreement (IOA) was determined by having each of the authors independently code 40% of the other author's assigned studies. There was 100% agreement for each of the components reviewed.

1.2. Calculation of intervention effects

For single-subject design studies with experimental control, percentages of non-overlapping data (PND; Scruggs, Mastropieri, & Casto, 1987) were calculated to estimate effects of the

interventions. For studies that did not report PNDs, we calculated PNDs if individual data points were displayed (either numerically or graphically). To calculate PND, the most extreme (highest for targeting high performance and lowest for targeting low performance) data point in the baseline phase(s) was noted and all points in the intervention phase(s) that exceeded that point were counted and divided by the total number of points in the intervention phase(s) (Scruggs et al., 1987). This number was converted to a percentage and reported as the PND.

We then grouped studies that examined similar types of instruction and averaged PNDs across those studies in order to draw conclusions about that type of instruction. PNDs ranging from 70 to 100 are considered effective interventions; those ranging from 50 to 70 are questionable; and those below 50 are ineffective (Scruggs & Mastropieri, 2001).

2. Results

Nine studies described in eight articles (summarized in Table 1) met criteria to be included in this review. Findings are described below, first in terms of content (i.e., participants, settings, designs, dependent variables, and independent variables), then in terms of effects.

2.1. Content findings

2.1.1. Participants

The total number of participants with intellectual or developmental disabilities across the nine studies was 31. All nine studies reported the gender and age of the participants. Twenty-nine (93.5%) participants were male and two (6.5%) were female. Their ages ranged from 6 to 18, with a mean of 11.3 years. Four (44.4%) studies reported the grade levels of participants. In these studies, grade levels ranged from 5 to 8. Five (55.6%) studies reported IQ of participants. IQs ranged from 45 to 74 with a mean of 62.7. Eight (88.9%) studies reported ethnicities of their participants, providing information on a total of 27 (87.1%) of all participants in the studies reviewed. The ethnicities of these 27 participants included 40.7% ($n = 11$) Caucasian, 22.2% ($n = 6$) Japanese (study conducted in Japan), 14.8% ($n = 4$) African–American, 14.8% ($n = 4$) Turkish (study conducted in Turkey), and 7.4% ($n = 2$) Mexican–American. Nine (29%) of the participants were diagnosed with autism spectrum disorders.

2.1.2. Settings

Settings were reported in all nine studies. Six (66.7%) investigations occurred in school settings; two (22.2%) took place in a university computer room (i.e., Yamamoto & Miya, 1999); and one (11.1%) took place at a child development institute (i.e., Rousseau, Krantz, Poulson, Kitson, & McClannahan, 1994).

2.1.3. Designs

Six (66.7%) of the studies used single-subject experimental designs, and three (33.3%) employed pre-experimental designs (e.g., pre-test–post-test case study design used by Yamamoto & Miya, 1999). Of the six single-subject experiments, three used multiple-probe designs, two used multiple-baseline designs, and one used a reversal design.

2.1.4. Dependent variables

Dependent variables included measures of writing quality/accuracy (e.g., correct word sequences; $n = 8$), productivity (number of words written; $n = 5$), pre-writing (e.g., planning

Table 1
Summary of research on writing interventions for individuals with intellectual or developmental disabilities (DD)

Author(s)	Participants	Design	Independent variable(s)	Dependent variable(s)	Results
De La Paz and Graham (1997)	Three students included but only one (Rand) with mental retardation (MR; (64 full scale IQ, 11 years-6 months; grade 5; African-American male)	Multiple probe across subjects	4–8 one-on-one instructional sessions (45–55 min each) using self-regulated strategy development (SRSD) model to teach strategies:	Time spent planning	Rand increased time spent writing, # of words written, # of essay elements, coherence scores, quality scores
			Suspend judgment, Take a side, Organize ideas, Plan (STOP) and Develop topic sentence, Add supporting ideas, Reject possible arguments from other side, End with conclusion (DARE)	# of "unique ideas" on students' planning sheets	He did not increase planning time, # of "unique ideas," # of transformations, strategy use
	Self-contained classroom in suburban elementary school			# of transformations between plan and essay (e.g., deletions, additions)	There was maintenance on most skills, although levels not has high as immediately after intervention
				Time spent writing	Rand did not reach levels comparable to other students in study
				Strategy use (e.g., key words from mnemonics)	Rand indicated he did not think planning was needed
				# of words written	100% PND for # of essay elements for Rand (could not calculate PNDs for other dependent variables)
				# of essay elements	
				Coherence—followed a certain pattern	
				Quality of essay (holistic scale)	

Guzel-Ozmen (2006)	Four students with MR (IQs ranged from 65 to 71; ages 13–17; grades 5–8; Turkish males)	Multiple probe across subjects	Modified cognitive strategy instruction in writing (CSIW) using four phases: instruction, modeling, guided practice, and independent practice	# of problem/ solution elements included in text	Students increased text structure elements, time spent planning, total writing time, text length, coherence, and quality
				Time spent planning	
	Two self-contained classrooms			Total writing time	Maintenance results were mixed
				Text length	100% PND on text structure elements scale for all four students (could not calculate PNDs for other dependent variables)
				Coherence	
				Quality	
Hendrick et al. (1999)	Nine students with mild to moderate MR (IQs ranged from 40 to 76; average age of 9; 7 White, 2 Mexican American; 8 males, 1 female)	Pre-experi-mental pre-test/post-test (i.e., no experimental control)	Four blocks literacy approach	Sores on Test of Early Reading Ability (TERA-2)	All students made gains on the TERA-2, story retellings, quality of writing samples, and Brigance
			Basal block (e.g., choral reading)	Story retellings	Seven of the eight students showed gains on the ARI, although only two showed gains on the reading comprehension portion

Table 1 (*Continued*)

Author(s)	Participants	Design	Independent variable(s)	Dependent variable(s)	Results
	Self-contained classroom in a middle SES neighborhood		Literature block (e.g., listening to teacher read aloud)	Quality of writing samples	No tests of statistical significance
			Word block (e.g., word wall, spelling practice)	Brigance sight words	No experimental control
			Writing block (e.g., writing sentences with fill in the blanks, writing to a structured prompt)	Analytical Reading Inventory (word lists, beginning sounds, oral reading, reading comprehension)	PND could not be calculated
Konrad and Test (2007)	Twelve middle school students included but only one (DJ) with mild MR (age 15; grade 8; Caucasian male)	Multiple probe across subjects	Elevan 45-min scripted lessons delivered in group format; encompassed all six stages of the SRSD model; additional prompting and feedback stages were added to promote generalization	Content of IEP paragraphs	DJ (the student with MR) increased scores on content, writing quality of goals paragraphs, and writing quality of generalization paragraphs
				Writing quality in goal paragraphs	There were no functional relations found for other dependent variables
	Four resource language arts classrooms in two schools (one middle school, one K-8 school)			Length of goal paragraphs	Maintenance and generalization results were mixed
				Correct word sequences minus incorrect word sequences (CWS − IWS) in goal paragraphs with and without spelling counted	100% PND on IEP paragraph content for DJ (but not a measure of writing quality)

				Quality of generalization paragraphs	100% PND on IEP paragraph quality for DJ
				Length of generalization paragraphs	19% PND on generalization paragraph quality for DJ
				CWS − IWS in generalization paragraphs with and without spelling counted	
				Quality of written responses to sample state writing test prompts	
Konrad et al. (2006)	Four high school students with orthopedic impairments but only 3 (Steve, Mark, and Jake) had MR (ages 15–18; 1 African American male, 2 Caucasian males)	Multiple baseline across subjects	Elevan 45-min lessons delivered in a 1:1 format; lessons included review of previously learned concepts, teacher input/modeling, practice with feedback; lessons encompassed all six stages of the SRSD model	Quality of goal paragraphs	All three students with MR made gains on quality and content of goal paragraphs
				Content of goal paragraphs	All students maintained improvements
	Self-contained high school classroom			Quality of generalization paragraphs	Generalization results were mixed but overall improvements were seen
					Students were satisfied with intervention based on social validity questionnaire

Table 1 (*Continued*)

Author(s)	Participants	Design	Independent variable(s)	Dependent variable(s)	Results
					100% PND for IEP paragraph content for the three students with MR (not categorized as a measure of writing quality) 100% PND for IEP paragraph quality for the three students with MR 6% PND for generalization paragraph quality for the three students with MR
Rousseau et al. (1994)	Three students with autism and MR (IQs ranged from 45 to 74; ages 11–13; 2 males, 1 female)	Multiple baseline across subjects	Sentence-combining instruction 5 days per week; each session divided into two 20-min periods: Worksheet period (teacher demonstrated how to combine two sentences by inserting the underlined adjective into the first sentence and deleting the caret and the second sentence—caret was dropped later)	# of adjectives per *T*-unit # of new adjectives	More adjectives per *T*-unit following intervention for all three participants Increases in new adjectives used in students' writing

	Self-contained classrooms at a child development institute		Writing period (students wrote about pictures)	*T*-Unit length	Increases in average *T*-unit length from baseline to intervention (although not to level of normative samples)
			Students received tangible reinforcers for using adjectives in their writing in baseline and intervention		Students maintained gains
					74% PND for adjectives per *t*-unit (mean across the three participants; could not report PND for new adjectives because graphed as cumulative frequency; could not report PND for *T*-unit length because reported as means and not graphed)
Vacc (1987)	Four students with mild MR (IQs ranged from 65 to 72; ages 14–15; grade 8; 3 African American males, 1 Caucasian male)	Counter-balanced reversal	Both conditions included standardized directions for students to write a letter and a review of basic letter requirements; in one condition students hand-wrote the letter, and in the other condition they wrote letters on the computer	# of words written	Longer letters written with computer
				Time on task	More time on task with computer

Table 1 (*Continued*)

Author(s)	Participants	Design	Independent variable(s)	Dependent variable(s)	Results
	Separate reading room in a middle school library			# of revisions made	More revisions with computer
				# of words written per minute	Words written per minute higher with handwriting
				Quality (holistic score)	No differences between conditions for quality
					Only time on task was graphed so could not see trends and variability
					88% PND (computer-generated over handwritten) for time on task (mean across all four participants; not a measure of writing; could not report PND for other dependent variables because not graphed)
Yamamoto and Miya (1999)-Exp. 1	Three students with autism and MR (ages 6–10; Japanese males)	Pre-test–post-test case study	Computer-based instruction for teaching students to construct sentences by selecting words with the mouse and arranging them in order	# of correct computer-based constructed sentences	Mean percent correct for sentence construction was 100%, 79%, and 100% for the three students
				# of correct vocal sentences	Mean percent correct for vocal sentence responses was 96%, 88%, and 96%

	University computer room				No experimental control so PND was not calculated
Yamamoto and Miya (1999)-Exp. 2	Same as Exp. 1	Same as Exp. 1	Computer-based instruction for teaching students to construct sentences by selecting particles with the mouse and arranging them in order.	# of correctly chosen particles to fill in blanks	Mean percent was 59 for one student and 100 for two students on particle choice, and 92, 92, and 100 for three students on sentence construction.
				# of correct handwritten sentences with appropriate grammar (transfer measure)	No experimental control so PND was not calculated

during the writing process; $n = 2$), and emergent/alternative writing skills (e.g., computer-assisted sentence construction; $n = 2$).

In addition, there were three studies that included outcome variables other than those that measured writing skills. For example, Vacc (1987) measured time on task, and Hendrick, Katims, and Carr (1999) measured reading skills.

2.1.5. Independent variables

Strategy instruction was the most common independent variable; some form of strategy instruction was used in four (44.4%) of the studies. For example, De La Paz and Graham (1997) used the self-regulated strategy development (SRSD; Harris & Graham, 1992) model to teach students to compose opinion essays. This approach to teaching writing strategies consisted of six stages: (a) initial conference, (b) discussion of the strategy, (c) modeling of the strategy, (d) collaborative practice, (e) independent practice, and (f) memorization of the strategy steps. Instruction consisted of four to eight one-on-one sessions (45–55 min each) to teach the strategy and mnemonics to help students remember the steps: STOP (Suspend judgment, Take a side, Organize ideas, Plan) and Develop topic sentence, Add supporting ideas, Reject possible arguments from other side, End with conclusion (DARE).

Konrad, Trela, and Test (2006) and Konrad and Test (2007) also used the SRSD (Harris & Graham, 1992) model. Specifically, they taught students to write paragraphs about their IEP goals using the ''GO 4 IT. . .NOW!'' strategy. In each of these studies, students progressed through the six SRSD stages in 11 lessons (45 min each). Students learned to write a Goal statement (topic sentence) and four (4) Objectives (supporting details) and to Identify a Timeline. The students were also taught that the ''NOW'' portion of the strategy could used to write all kinds of paragraphs: Name your topic, Order the details, and Wrap it up and restate topic.

Guzel-Ozmen (2006) used modified cognitive strategy instruction in writing (CSIW; Englert, Raphael, Anderson, Anthony, & Stevens, 1991) to teach students how to plan and write problem/solution text in one-on-one sessions. Instruction consisted of four phases: (a) text instruction (e.g., teacher highlighted text features using graphic organizers), (b) modeling (e.g., teacher self-talked using a ''plan think-sheet''), (c) guided practice (e.g., teacher monitored students' process and provided feedback), and (d) independent practice (e.g., teacher promoted students' independent use of the strategies). Total instructional timed ranged from 9 to 19 h.

Computer-based instruction was used as the independent variable in three studies. First, Vacc (1987) implemented letter-writing instruction with and without a computer. Instruction included 45-min, small-group lessons with standardized directions for students to write a letter and a review of basic letter requirements. The word-processing program that was used by the students was Wordstar (Micropro, 1979).

In two studies, Yamamoto and Miya (1999) implemented computer-based instruction designed to teach students to construct sentences by selecting words and phrases with the mouse and arranging them in logical order. Instructional sessions lasted 20 min each and took place once a week.

Rousseau et al. (1994) taught students sentence-combining skills using daily 40-min, one-on-one instructional sessions. During the first 20 min of each session, students completed sentence-combing worksheets, which consisted of guided and independent practice exercises. In the second 20 min of each session, students wrote in response to picture prompts. Students earned pennies for correct use of adjectives in their writing.

Hendrick et al. (1999) studied the Four Blocks literacy approach. The four blocks included a basal block (e.g., choral reading), a literature block (e.g., listening to teacher read aloud), a word

block (e.g., word wall, spelling practice), and a writing block (e.g., sentence writing with fill in the blanks, writing to a structured prompt). Daily lessons included 45 min for each block.

2.2. Intervention effects

We were able to calculate PND for at least one dependent measure of writing for five (55.6%) of the studies that we included (see Table 1). In all five of these studies, the writing measures for which PNDs were calculated were categorized as measures of quality/accuracy. Four of these studies examined strategy instruction (De La Paz & Graham, 1997; Guzel-Ozmen, 2006; Konrad & Test, 2007; Konrad et al., 2006), and one examined sentence combining instruction (Rousseau et al., 1994). For the studies that examined strategy instruction, PNDs were 100% for the dependent variables (e.g., number of essay elements) and 6% and 19% with a mean/median of 12.5% for the two studies that graphed generalization results (e.g., quality of paragraphs written daily). For the sentence-combining study, PND was 74% for number of adjectives per *T*-unit. Additionally, we calculated PND for a pre-writing dependent variable (i.e., time spent on-task during writing activity; Vacc, 1987). For this dependent variable, PND was 88%. We did not calculate PNDs when individual data points were not displayed (either numerically or graphically).

3. Discussion

The purpose of this review was to synthesize the research literature on the types and effects of writing instruction for students with intellectual or developmental disabilities. Very few experimental studies were discovered. Findings from these studies revealed that students with intellectual or developmental disabilities benefited from writing instruction (e.g., developing plans and composing lengthy text). This was significant from a research-to-practice perspective. Among these studies, strategy instruction was the predominant method of teaching writing skills to students with intellectual or developmental disabilities. This appears to be consistent with research on writing instruction for students with learning disabilities and those without disabilities (e.g., Bui et al., 2006; Wong, Butler, Ficzere, & Kuperis, 1996). However, there are far more published experimental studies on teaching writing to students with learning disabilities and those without disabilities (for a review see Gersten & Baker, 2001) than there are for students with intellectual or developmental disabilities. Among strategy instruction approaches to teaching writing to students with learning disabilities, the self-regulated strategy development (SRSD) model appears to permeate the literature (Graham & Harris, 2005). Similarly, this review found that SRSD was the most frequently used strategy instruction approach for students with intellectual or developmental disabilities. Among various types of instruction that were reviewed, strategy instruction yielded the strongest writing performance outcomes for students with intellectual or developmental disabilities.

Measures of writing quality/accuracy was the most frequent outcome variable followed by productivity across the studies that were reviewed. Fewer investigations assessed whether prewriting tasks (e.g., planning) occurred.

The majority of studies employed single-subject experimental designs to test the effectiveness of writing instruction followed by pre-experimental designs. The studies that employed single-subject experimental designs included a control condition for which instruction conditions were compared, whereas, attempts to exercise experimental control was not apparent in the remaining studies.

3.1. Limitations

First and foremost, we are hesitant to draw definitive conclusions regarding the generality of the findings due to the relatively small number of experimental studies and participants included across all the studies in this review. Systematic replications examining *each* type of writing instruction are needed in order to determine which methods are most effective for this population. Among all studies reviewed, one-third of those studies did not demonstrate experimental control. For those studies, internal validity was compromised which it made it difficult for us to determine if the writing instruction method that was implemented contributed to the students' writing growth. Most of the instructional approaches studied were delivered in a one-on-one format so conclusions about their effectiveness for teaching students with intellectual disabilities in small and large group settings could not be made. Moreover, randomized group experimental designs were not employed in any of the studies in this review so comparisons between experimental and control groups could not be summarized. In the current review, only one study (i.e., Vacc, 1987) reported effect sizes. We were not able to report effect sizes for the other studies because authors of those studies did not include effect sizes or standard deviations and other information that would have allowed us to calculate effect sizes.

3.2. Directions for future research

More research is needed to determine what outcomes are being affected and if they can be differentiated based on types of writing instruction. Moreover, future researchers may wish to investigate other methods of teaching writing that have not been examined with students with intellectual or developmental disabilities but that have been shown to be effective for teaching writing to students with learning disabilities and those without learning disabilities (e.g., interactive writing, story maps). Perhaps, more importantly, investigators may wish to discover which instructional components (i.e., modeling, opportunities to respond, corrective feedback, reinforcement) have the most robust effects for helping students with intellectual disabilities produce a substantial quantity of high quality written products.

Future research may also focus on teaching written expression skills across different genres (e.g., persuasive essays, poems) and diverse instructional settings. Researchers indicate that group instruction can be just as effective, and thus more efficient, than one-on-one instruction (Vaughn et al., 2003). Therefore, future studies should examine the effects of teaching writing to small and large groups of students with intellectual disabilities. Therefore, future researchers may want to consider employing randomized experimental group designs to make comparisons among approaches that are designed for teaching writing skills to students with intellectual disabilities in large- and small-group settings.

In the studies that measured generalization, findings indicated that students had difficulty generalizing their writing skills to novel writing tasks. This finding is consistent with what we know about (a) the challenges of learning to write (Troia, 2002), and (b) the learning characteristics of individuals with intellectual disabilities (Heward, 2006). Future investigations should include generalization outcome measures as well as more systematic efforts to promote generalization.

In addition to exploring the generalization of skills from one context to another, researchers may determine how well students with intellectual disabilities adapt learning certain types of literacy skills to other types of skills. For instance, in the studies that were reviewed, there was some discussion about the role that reading may play in developing writing skills (e.g., Hendrick

et al., 1999); however, this connection has not been examined empirically with students with intellectual disabilities. Future researchers may wish to examine the relationship between reading and writing development with this population to determine if there are special considerations that need to be taken into account.

3.3. Recommendations for practice

Despite the small number of published studies and their limitations, findings from this review indicated that students with intellectual disabilities can benefit from writing instruction and can be taught learning strategies to help them improve the quantity and quality of their written expression. Therefore, teachers of children and youth with intellectual disabilities are encouraged to find ways to embed such instruction into their daily curriculum. With appropriate modifications/accommodations (e.g., increased opportunities to write, assistive technology), writing instructional methods that have worked for other students are likely to work, at least to some degree, for students with intellectual disabilities (see Konrad & Trela, 2007, for suggestions on how to modify strategy instruction for students with intellectual disabilities). Teaching components such as modeling, providing guided practice, correcting errors, allowing plenty of opportunities for practice, and delivering reinforcers should be incorporated according to the individual needs of students during writing lessons.

Importantly, systematically promoting generalization should also be a significant component of teaching writing to students with intellectual disabilities. For instance, Stokes and Bear's (1977) strategies (i.e., aim for natural contingencies of reinforcement, teach enough examples, program common stimuli, teach loosely, program indiscriminable contingencies, and self-management) may be used to promote generalized learning outcomes. Educators way wish to consult Alber-Morgan, Hessler, and Konrad (2007) for an extensive discussion on how these instructional strategies can promote generalized writing outcomes in each stage of the writing process: prewriting, drafting, revising, and publishing.

Data on students' writing performance should be gathered on an ongoing basis to determine (a) if students are making adequate progress, (b) what skills need further development, and (c) if the type and amount of instruction is appropriate for meeting students' needs in an efficient manner. Specifically, data can help educators identify at which stage of the learning hierarchy (acquisition, fluency, and generalization; Haring & Eaton, 1978) students are functioning and make decisions about instruction accordingly.

Explicit and systematic writing instruction will allow students with intellectual or developmental disabilities to broaden their modes of communication and creative expression. If students with intellectual disabilities acquire sufficient written communication skills, they may be likely to access a variety of employment and social opportunities that they may have otherwise overlooked, avoided, or dismissed in our advanced technological society.

References[1]

Alber-Morgan, S., Hessler, T., & Konrad, M. (2007). Teaching writing for keeps. *Education and Treatment of Children, 30*, 107–128.

Arabsolghar, A., & Elkins, J. (2000). Comparative expectations of teachers and parents with regard to memory skills in children with intellectual disabilities. *Journal of Intellectual & Developmental Disabilities, 25*, 169–179.

[1] An asterisk (*) before the reference indicates that this citation met the criteria for review.

Banikowski, A. K., & Mehring, T. A. (1999). Strategies to enhance memory based on brain research. *Focus on Exceptional Children, 32*, 1–16.

Berninger, V., Abbott, R., Rogan, L., Reed, E., Abbott, S., Books, A., et al. (1998). Teaching spelling to children with specific learning disabilities: The mind's ear and eye beat the computer or pencil. *Learning Disability Quarterly, 21*, 106–122.

Browder, D., Wakeman, S. Y., Spooner, F., Ahlgrim-Delzell, L., & Algozine, B. (2006). Research on reading instruction for individuals with significant cognitive disabilities. *Exceptional Children, 72*, 392–408.

Bui, Y. N., Schumaker, J. B., & Deshler, D. D. (2006). The effects of a strategic writing program for students with and without learning disabilities in inclusive fifth-grade classes. *Learning Disabilities Research and Practice, 21*, 244–260.

Clay, M. (1975). *What did I write?* London: Heinman Educational Books Ltd.

*De La Paz, S., & Graham, S. (1997). Strategy instruction in planning: Effects on the writing performance and behavior of students with learning difficulties. *Exceptional Children, 63*, 167–181.

Deatline-Buchman, A., & Jitendra, A. K. (2006). Enhancing argumentative essay writing of fourth—Grade students with learning disabilities. *Learning Disability Quarterly, 29*, 39–54.

Dever, R. B. (1990). Defining mental retardation from an instructional perspective. *Mental Retardation, 28*, 147–153.

Eikeseth, S., & Jahr, E. (2001). The UCLA reading and writing program: An evaluation of the beginning stages. *Research in Developmental Disabilities, 22*, 289–307.

Englert, C. S., Raphael, T. E., Anderson, L. M., Anthony, H. M., & Stevens, D. D. (1991). Making strategies and self-talk visible: Writing instruction in regular special education classrooms. *American Educational Research Journal, 28*, 337–372.

Erickson, K. A., Koppenhaver, D. A., & Yoder, D. E. (November 1994). *Literacy and adults with developmental disabilities*. Philadelphia, PA: National Center on Adult Literacy. (Tech. Rep. TR94-15).

Gersten, R., & Baker, S. (2001). Teaching expressive writing to students with learning disabilities: A meta-analysis. *The Elementary School Journal, 101*, 251–272.

Graham, S., & Harris, K. R. (1997). It can be taught, but it doesn't develop naturally: Myths and realities in writing instruction. *School Psychology Review, 26*, 414–424.

Graham, S., & Harris, K. R. (2005). *Writing better: Effective strategies for teaching students with learning difficulties*. Baltimore: Paul H Brookes Publishing Co.

*Guzel-Ozmen, R. (2006). The effectiveness of modified cognitive strategy instruction in writing with mildly mentally retarded Turkish students. *Exceptional Children, 72*, 281–297.

Haring, N. G., & Eaton, M. D. (1978). Systematic instructional procedures: An instructional hierarchy. In N. G. Haring, T. C. Lovitt, M. D. Eaton, & C. L. Hansen (Eds.), *The fourth R: research in the classroom* (pp. 23–40). Columbus, OH: Merrill.

Harris, K. R., & Graham, S. (1992). *Helping young writers master the craft: Strategy instruction and self-regulation in the writing process*. Cambridge, MA: Brookline.

*Hendrick, W. B., Katims, D. S., & Carr, N. J. (1999). Implementing a multimethod, multilevel literacy program for students with mental retardation. *Focus on Autism and Other Developmental Disabilities, 14*, 231–239.

Heward, W. L. (2006). *Exceptional children: An introduction to special education*. Upper Saddle River, NJ: Pearson.

Kaderavek, J. N., & Rabidouz, P. (2004). Interactive to independent literacy: A model for designing literacy goals for children with atypical communication. *Reading and Writing Quarterly, 20*, 237–260.

Kahn-Freedman, E. K. (2001). Finding a voice: Poetry and people with developmental disabilities. *Mental Retardation, 39*, 195–200.

*Konrad, M., & Test, D. W. (2007). Effects of GO 4 IT. . .NOW! strategy instruction on the written IEP goal articulation and paragraph-writing skills of middle school students with disabilities *Remedial and Special Education, 28*, 277–291.

Konrad, M., & Trela, K. (2007). GO 4 IT. . .NOW! Extending writing strategies to support all students *Teaching Exceptional Children, 39*(4), 38–47.

*Konrad, M., Trela, K., & Test, D. W. (2006). Using IEP goals and objectives to teach paragraph writing to high school students with physical and cognitive disabilities. *Education and Training in Developmental Disabilities, 41*, 111–124.

Lasater, B., & Elliott, B. (2004). Profiles of the adult education target population. Washington, DC: Office of Vocational and Adult Education, U.S. Department of Education. Retrieved from December 14, 2007, from http://www.ed.gov/about/offices/list/ovae/pi/AdultEd/census1.pdf.

Micropro. (1979). *Wordstar (Computer program)*. San Rafael, CA: MicroPro International Cooperation.

Newcomer, P. L., & Barenbaum, E. M. (1991). The written composing ability of children with learning disabilities: A review of the literature from 1980 to 1990. *Journal of Learning Disabilities, 24*, 163–172.

No Child Left Behind Act. (2001). Public Law No. 107-110, Washington, DC: U.S. Congress.

Pershey, M. G., & Gilbert, T. W. (2002). Christine: A case study of literacy acquisition by an adult with developmental disabilities. *Mental Retardation, 40*, 219–234.

*Rousseau, M. K., Krantz, P. J., Poulson, C. L., Kitson, M. E., & McClannahan, L. E. (1994). Sentence combining as a technique for increasing adjective use in writing by students with autism. *Research in Developmental Disabilities, 15*(1), 19–37.

Scruggs, T. E., & Mastropieri, M. A. (2001). How to summarize single-participant research: Ideas and applications. *Exceptionality, 9*, 227–244.

Scruggs, T. E., Mastropieri, M. A., & Casto, G. (1987). The quantitative synthesis of single-subject research: Methodology and validation. *Remedial and Special Education, 8*, 24–33.

Stokes, T. F., & Baer, D. M. (1977). An implicit technology of generalization. *Journal of Applied Behavior Analysis, 10*, 349–367.

Strum, J. (2000). Supporting writing development in adolescents with developmental disabilities. *Topics in Language Disorders, 20*, 73–92.

Troia, G. A. (2002). Teaching writing strategies to children with disabilities: Setting generalization as the goal. *Exceptionality, 10*, 249–269.

Turner, L. A., Dofny, E. M., & Dutka, S. (1994). Effects of strategy and attention training on strategy maintenance and transfer. *American Journal on Mental Retardation, 98*, 445–454.

*Vacc, N. N. (1987). Word processor versus handwriting: A comparative study of writing samples produced by mildly mentally handicapped students. *Exceptional Children, 54*, 156–165.

Vaughn, S., Linan-Thompson, S., Kouszkanani, K., Bryant, D. P., Dickson, S., & Blozis, S. A. (2003). Reading instruction grouping for students with reading difficulties. *Remedial and Special Education, 24*, 301–315.

Wong, B. Y. L., Butler, D. L., Ficzere, S. A., & Kuperis, S. (1996). Teaching low achievers and students with learning disabilities to plan, write, and revise opinion essays. *Journal of Learning Disabilities, 29*, 197–212.

*Yamamoto, J., & Miya, T. (1999). Acquisition and transfer of sentence construction in autistic students: Analysis by computer-based teaching. *Research in Developmental Disabilities, 20*(5), 355–377.

Yin, R. K. (1989). *Case study research: Design and methods*. Newbury Park, CA: Sage.