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MIDDLE AND HIGH SCHOOL STUDENTS WITH LEARNING DISABILITIES: PRACTICAL ACADEMIC INTERVENTIONS FOR GENERAL EDUCATION TEACHERS – A REVIEW OF THE LITERATURE

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ABSTRACT

Increasingly, students with learning disabilities are being educated in the general education setting by general education teachers. This trend requires general education teachers to use instructional practices that benefit all students. This article reviews of the literature from 1986 to 2002 in order to identify and examine academic interventions for middle and high school students with learning disabilities that can be applied to various subject areas. The practices that appeared to be most effective were categorized under the following headings: (a) mnemonic instruction, (b) graphic organizers, (c) guided notes, (d) class wide peer tutoring, (e) coached elaboration, and (f) inquiry teaching.

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As educational reform has become more heavily focused on inclusion
and standards-based assessment, general education teachers have
been held increasingly responsible for educating students with learn-
ing disabilities (LD). Today, nearly two million adolescents are being
served under the category of learning disabilities (U. S. Department of
Education, 2000). 75% of all special education students spend 40%
or more of their day in general education and 96% of all general edu-
cation teachers teach or have taught students with disabilities
(SPeNSE, 2002). Moreover, the Individuals with Disabilities Education
Act Amendments of 1997 (Public Law 105-17) and the No Child Left
Behind Act require that students with disabilities participate in all
state- and district-wide assessment. These laws not only codify previ-
ous calls for integration of students with disabilities into the general
education setting (Heumann, 2000), making inclusion a necessity for
nearly every student with a disability, but they also give general edu-
cation teachers the additional role of preparing students with disabili-
ties for standardized tests.

Given the aforementioned statistics, it is clear that there are a
huge number of students in middle and high schools who are receiv-
ing special education services under the LD category and being edu-
cated in general education. As Scanlon, Deshler, and Schumaker
(1996) report, "several instructional challenges await classroom teach-
ers who have responsibility for teaching classes ... which include stu-
dents with disabilities" (p. 42). They propose a reconceptualization of
teaching at the secondary level that encompasses both content and
strategy instruction. With the increasing curriculum demands (i.e.,
passing standardized tests) being placed on middle and high school
students with learning disabilities, it is vital to provide general educa-
tion teachers with the tools that will benefit students both with and
without disabilities.

The purpose of this review was to locate empirical studies that
have investigated the use of an academic intervention that was effec-
tive in enhancing the academic performance of middle and high
school students with learning disabilities, which could ultimately
enhance the academic performance of students without LD.
Interventions included in this study were those that teachers could use

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regardless of their content areas. This review presents five types of strategies that are applicable across different academic content areas (e.g., English, math, science, social studies).

METHODOLOGY

The methodology employed in this review is a narrative synthesis of intervention research that has been conducted with middle and high school students with learning disabilities. Studies in this review used a specific instructional strategy with middle and high school students that could be generalized across various subject areas.

Several strategies were employed to locate appropriate articles. A computerized search was conducted through ERIC using key words such as *learning disabilities and interventions; learning disabilities and secondary education; learning disabilities and secondary education and interventions; learning disabilities and adolescents and interventions; learning disabilities and high school students and interventions; learning disabilities and middle school students and interventions* for the years 1986 - 2002.

In addition, a hand search of the following journals was conducted: *Learning Disabilities Quarterly; The Journal of Learning Disabilities; Learning Disabilities Research and Practice;* and *Remedial and Special Education*. These journals were chosen because they specifically targeted students with learning disabilities. Several books (e.g., *Strategies for Teaching Learners with Special Needs, Learning Disabilities: Theories, Diagnosis, and Teaching Strategies, Learning Disabilities: Characteristics, Identification, and Teaching Strategies*) were also scanned for information that might be useful regarding our topic.

Articles included met the following requirements: (a) the study was empirical in nature; (b) participants were in grades six through twelve; (c) participants were identified as learning disabled according to state and federal guidelines; (d) studies investigated the effectiveness of a specific academic intervention; and (e) interventions used with the participants had the ability to be generalized across various subject areas.
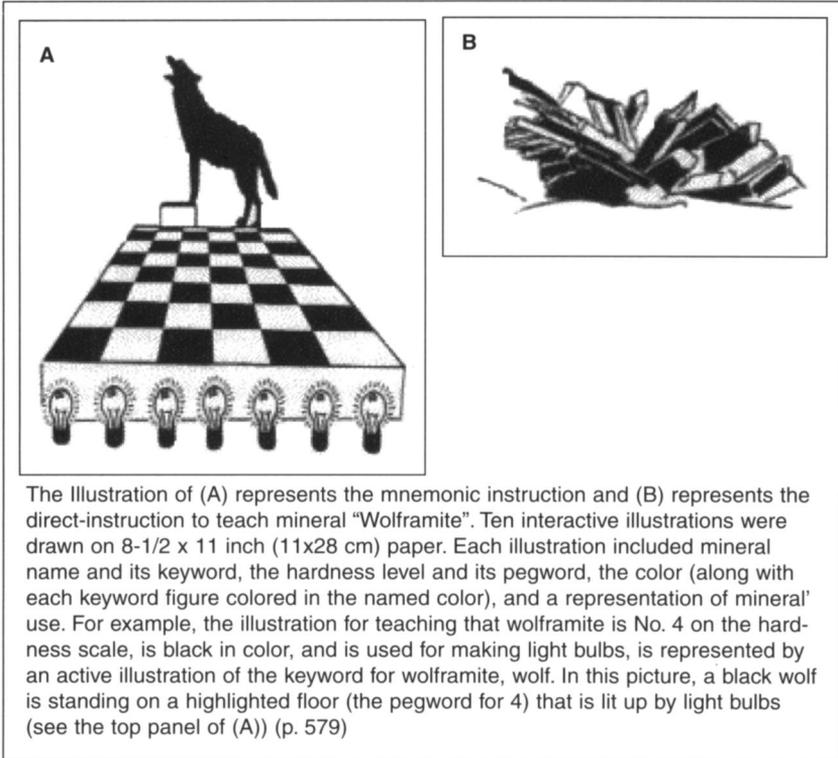
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INTERVENTIONS

MNEMONIC INSTRUCTION

RATIONALE: According to Scruggs and Mastropieri (1990), "mnemonic" is a specific reconstruction of target content that is intended to tie new information to the learner's existing knowledge base and, therefore, facilitate retrieval (p. 271-272). The use of mnemonic instruction can help students remember and retain information that is difficult to recall.

TYPES OF MNEMONIC INSTRUCTION: Mnemonic instruction can take many forms. The keyword and the acronym methods appear to be the most effective. The keyword method ties the unfamiliar word with a similar-sounding familiar word (Scruggs & Mastropieri, 1990). The acronym method uses words that are familiar to most students and assigns a specific word or idea to each letter in the word.

RESEARCH STUDIES ON THE EFFECTIVENESS OF MNEMONIC INSTRUCTION WITH MIDDLE AND/OR HIGH SCHOOL STUDENTS WITH LEARNING DISABILITIES: Several research studies have investigated using mnemonic instruction with middle and high school students with learning disabilities across various subject areas. Scruggs, Mastropieri, Levin, and Gaffney (1985) investigated the effectiveness of four teaching strategies (mnemonic instruction, free study, direct instruction, and reduced-list direct instruction) on facilitating the acquisition of facts about minerals by students with LD (see The Illustration).

Statistical analysis revealed that among the three full list conditions (mnemonic, direct instruction, and free study), students in the mnemonic condition recalled more attributes than the students in other two learning conditions. Students in the reduced list direct instruction conditions were also more successful than the students in the direct instruction and free study conditions.

Scruggs and Mastropieri (1992) also investigated the use of various mnemonic strategies (i.e., mimetic reconstructions, symbolic reconstructions, acoustic reconstructions) with high school students with learning disabilities. Mnemonic instruction was more effective in terms of increasing students' conceptual understanding of the target information. Moreover, delayed recall test analysis suggested that students in the mnemonic instruction conditions remembered more information than students in the traditional teaching method.

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The Illustration of (A) represents the mnemonic instruction and (B) represents the direct-instruction to teach mineral "Wolframite". Ten interactive illustrations were drawn on 8-1/2 x 11 inch (11x28 cm) paper. Each illustration included mineral name and its keyword, the hardness level and its pegword, the color (along with each keyword figure colored in the named color), and a representation of mineral' use. For example, the illustration for teaching that wolframite is No. 4 on the hardness scale, is black in color, and is used for making light bulbs, is represented by an active illustration of the keyword for wolframite, wolf. In this picture, a black wolf is standing on a highlighted floor (the pegword for 4) that is lit up by light bulbs (see the top panel of (A)) (p. 579)

Welch investigated the effectiveness of an acronym mnemonic called PLEASE (Pick, List, Evaluate, Activate, Supply, End), which was used to improve the paragraph writing of seven sixth graders with learning disabilities (Welch, 1992). The PLEASE strategy was designed to remediate deficits in the students' prewriting, planning, composition, and revision skills. Results of the study showed significantly higher scores for students in the treatment group on posttreatment writings.

CONCLUDING STATEMENTS ON MNEMONIC INSTRUCTION: Mnemonic instruction is a useful tool for enhancing recall and retention of information in middle and high school students in any subject area. For example, the PLEASE strategy can be used in the science classroom when students are required to write lab or project reports. Math

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teachers (e.g., geometry) can use the PLEASE strategy when they require students to write the reason why a specific proof can be accepted or rejected. History teachers can use it when they are requiring their students to explain the causes of the Civil War. Physical education teachers can use this strategy when they are requiring their students to write a paper on how to strengthen various muscles in the body.

GRAPHIC ORGANIZERS

RATIONALE: Doyle (1999) defined graphic organizers as any type of visual representation of concepts that helps organize information in a manner that makes the information easier to learn (p. 19). The use of graphic organizers (originally called a structured overview) can help students to strengthen their existing cognitive structure with newly learned concepts (Griffin, Malone, & Kameenui, 1995). Guastello (2000) stated that graphic organizers help teachers and students translate concepts into visual representations by constructing graphs, charts, and diagrams that share important information about a concept or concepts. These representations organize concepts in a manner that facilitates students' understanding and learning (Fisher, Schumaker, & Deshler, 1995). They can be used before instruction to elicit students' prior knowledge, during instruction to help students conceptualize the information, or at the end of instruction to summarize and/or review concepts as well as to assess students' understanding (Doyle, 1999).

TYPES OF GRAPHIC ORGANIZERS: Graphic organizers can take on different forms. Such forms include time lines, Venn diagrams, concept maps, inductive towers, flow charts, or any other visual depiction (Doyle, 1999).

RESEARCH STUDIES ON THE EFFECTIVENESS OF GRAPHIC ORGANIZERS WITH MIDDLE AND/OR HIGH SCHOOL STUDENTS WITH LEARNING DISABILITIES: Horton, Lovitt, and Bergerud (1990) conducted research to determine the effectiveness of using graphic organizers in mainstream content area classes with low-achieving and learning disabled students. Results across the three groups found the use of graphic organizers significantly more effective than self-study strategies (students answered 70% and 20% of questions correctly, respectively). The results of this study were consistent across content areas.

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In another study, the traditional method of teaching (lecture and note-taking) was compared with graphic organizers in the area of social studies. Statistical analysis revealed that the students who were taught with graphic organizers had higher scores on a posttest than the students taught by traditional teaching method (Doyle, 1999).

Bulgren, Schumaker, & Deshler (1988) studied the effectiveness of using teacher-created concept diagrams together with a concept teaching routine in order to enhance concept acquisition of 475 students in nine mainstream secondary education classrooms. During instruction, teachers constructed concept diagrams to teach various subjects to students while using the concept teaching routine (see Bulgren et al., 1988). The LD students' scores on both concept acquisition tests and their regularly scheduled tests were significantly higher when concept diagrams and the concept teaching routine were used during instruction.

Finally DiCecco & Gleason (2002) also studied graphic organizers. Students in the treatment group (those who used graphic organizers) had higher posttest scores on the content knowledge multiple-choice test than those in the control group. On the content knowledge fact quizzes, both groups performed equally well. On the written measures (posttest), students in the treatment group significantly outperformed students in the control group.

CONCLUDING STATEMENTS ON GRAPHIC ORGANIZERS: In the light of the studies reviewed above, graphic organizers can be accepted as a successful teaching strategy to improve middle and high school students' conceptual understanding about concepts from different subject areas. The way Horton et al. (1990) used graphic organizers can be easily modified to teach concepts from different subject areas. For example, science teachers can use this approach to teach animals in the animal kingdom, cell organelles, or elements in the periodic table. Language teachers can use graphic organizers to summarize a poem or novel. Mathematics teachers can use the same strategy to teach relationships among permutations, combinations, or probabilities.

GUIDED NOTES

RATIONALE: Guided notes can be defined as "teacher-prepared handouts that 'guide' a student through a lecture/discussion with standard cues and prepared spaces in which students can write the key

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facts, concepts, and/or relationships" (Heward, 1994, p. 304). Since note taking can be a difficult task for some students, particularly those with disabilities, the use of guided notes can give students a standard set of notes for future reference (e.g., tests, quizzes, etc.) as well as eliminate the possible frustration, lack of motivation, and off-task behaviors that may exist due to poor note-taking skills. Additionally, teachers should use guided notes in their classrooms because it gives students a set of accurate and complete notes and students demonstrate better academic achievement when guided notes are used (Hamilton, Seibert, Gardner, & Talbert-Johnson, 2000).

RESEARCH STUDIES ON THE EFFECTIVENESS OF GUIDED NOTES WITH MIDDLE AND/OR HIGH SCHOOL STUDENTS WITH LEARNING DISABILITIES: Hamilton et al. (2000) investigated the effects of guided notes, using a single subject ABAB reversal design. During the baseline conditions, participants were responsible for taking their own notes. In the treatment conditions, the participants were taught with guided notes. The results of this investigation revealed that participants retained more information when they were taught using guided notes as opposed to taking their own notes (as measured by next-day quizzes).

Sweeney, Ehrhardt, Gardner, Jones, Greenfield, and Fribley (1999) compared students' own note taking strategies with that of short- and long-form guided notes. Results revealed that both guided note procedures increased the accuracy of students' notes, improved session quiz scores, and were overwhelmingly preferred by the students themselves over taking their own notes.

Lazarus (1991a) investigated the effects of guided notes on the academic performance of secondary students in a science class. The findings of her study indicated that the use of guided notes produced larger gains on tests when compared to the tests the students took when studying their own notes. Another study conducted by Lazarus (1993b) also found guided notes to be an effective tool in enhancing students' academic performance in history.

CONCLUDING STATEMENTS ON GUIDED NOTES: Based on the aforementioned empirical research, guided notes is an effective instructional strategy that can be used in a variety of classroom settings and subject areas. Although empirical studies from the math and English areas were not available, the first author of this paper has used and seen guided notes be effective in these areas as well.

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CLASSWIDE PEER TUTORING

RATIONALE: According to Arreaga-Mayer (1998), classwide peer tutoring is a form of intraclass peer-mediated instruction that uses behavioral techniques to promote acquisition of academic and social behavior (p. 89). Tutors are taught to increase their partner's on-task behaviors, and provide feedback and reinforcement during the acquisition and maintenance of the academic content being covered, and to determine their partner's mistakes and provide correct responses during academic engaged time (Anderson & Yilmaz, 2002).

Classwide peer tutoring is an instructional method that can be easily implemented in classrooms to teach concepts from various subject areas such as math, English (spelling, reading, vocabulary), science, and social studies. Other beneficial characteristics of classwide peer tutoring include:(a) it provides students with the opportunity to establish supportive interaction with their teachers and classmates based on their needs,(b) it maximizes students learning by improving their academic performance both mentally and socially, and (c) it can help decrease off-task behaviors (Arreaga-Mayer, 1998).

RESEARCH STUDIES ON THE EFFECTIVENESS OF CLASSWIDE PEER TUTORING WITH MIDDLE AND/OR HIGH SCHOOL STUDENTS WITH LEARNING DISABILITIES: Maheady, Sacca, & Harper (1987) examined the effects of classwide peer tutoring teams on conceptual understanding of mathematical concepts via multiple baseline designs across settings. The results of the study revealed that classwide peer tutoring increased academic success of students with and without disabilities. Interestingly, disabled students' gain scores on the weekly tests were higher than nondisabled students' scores. The withdrawal of classwide peer tutoring from the classroom influenced the students' grades on the weekly quizzes, as their scores dropped dramatically when they returned to baseline. Another study mirrored these results in the area of social studies (Maheady, Sacca, & Harper, 1988).

Fuchs, Fuchs, & Kazdan (1999) also investigated the effects of a classwide peer tutoring program on high school students with disabilities who demonstrated serious reading difficulties. The researchers adapted PALS (Peer Assisted Learning Strategies), a program that was originally created for use with elementary school students, to the high school environment. Results indicated that the PALS program did improve students' reading comprehension more than conventional

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reading programs. Students also reported that they worked harder.
However, students' reading fluency and beliefs about reading did not
improve significantly.

CONCLUDING STATEMENTS ON CLASSWIDE PEER TUTORING: The litera-
ture reviewed above indicates that classwide peer tutoring is an effec-
tive intervention to enhance academic success of middle and high
school students with LD in different subject areas. This empirical
research clearly emphasizes that students enjoy teaching students who
have difficulty learning. On the other hand, students who have diffi-
culty understanding concepts through teacher instruction learn better
from their peers. Students can teach and learn any concepts belong-
ing to any subject area from each other. Because of this characteristic
of classwide peer tutoring, this intervention can be used in any subject
area to increase the effectiveness of the instruction.

COACHED ELABORATION

RATIONALE: Coached elaboration can be defined as an instruction-
al technique that allows students to make reasonable links between
current knowledge and new knowledge through the use of teacher
questioning (Anderson & Yilmaz, 2002b). The use of coached elabo-
ration in classrooms allows teachers to promote critical thinking and
active student responding in their classrooms. In addition, it promotes
independent learning (Scruggs & Mastropieri, 1993).

TYPES OF ELABORATIONS: In special education, the two types of
elaborations that have been studied are coached and provided.
Coached elaboration was defined and discussed above. Provided
elaboration differs from coached elaboration in that it provides the
link between the students' current knowledge and new knowledge.
For instance, instead of coaching the students to come up with the
correct link, the teacher would simply provide the students with the
factual information and its link.

RESEARCH STUDIES ON THE EFFECTIVENESS OF COACHED ELABORATION:
Mastropieri, Scruggs, Hamilton, Wolfe, Whedon, & Canevaro (1995)
conducted a study that investigated the use of coached elaboration
with students with learning disabilities. The results of the study sug-
gested that the amount of recall of actual information did not differ
between conditions; however, students trained in the coaching condi-
tion did produce significantly more correct explanations of the infor-

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mation than did students in the control condition.

Another study conducted by Anderson & Yilmaz (2002b) also investigated the effectiveness of coached elaboration. Participants were randomly assigned to one of three treatment conditions (coached elaboration, provided elaboration, and non-elaboration). Results revealed that the coached elaboration instructional technique was superior to the other two conditions.

CONCLUDING STATEMENTS ON COACHED ELABORATION: The research shared above indicates that coached elaboration is an effective teaching intervention that can enhance the academic success of middle and high school students with LD. If teachers decide to use coached elaboration in their classrooms, they should find that it is an instructional tool that can be easily adapted to various subject areas. Teachers must consider the thought that must go into developing the various prompts. Each prompt must be relevant to the previous prompt and must be easily understood by students.

INQUIRY TEACHING

RATIONALE: Inquiry teaching is a teaching and learning strategy that enables concepts from various academic subject areas (e.g., science, math, and social studies) to be mastered through investigations (Anderson & Yilmaz, 2002a). It allows students to make connections with the concepts they are learning, apply new information to information that they already know, and search for knowledge that will satisfy their curiosity about that subject area.

TYPES OF INQUIRY TEACHING: There are three types of inquiry teaching: structured inquiry, guided inquiry, and open inquiry (National Research Council, 2000). During structured inquiry, students are simply given the problems, procedures, and materials to come up with their own conclusions. Guided inquiry involves the teacher providing the materials and a statement of the problem to be investigated, and students are asked to generate their own procedures to solve the problem. Open inquiry requires students to formulate their own problem(s) and come up with the procedures for how to solve the problem(s) (Schaaf, 2002).

RESEARCH STUDIES ON THE EFFECTIVENESS OF INQUIRY TEACHING: Scruggs, Mastropieri, Bakken, & Brigham (1993) investigated the effects of textbook and activities-based science instruction on junior

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high schools students with LD. Students in the activities-based condi-
tions outperformed students in the textbook condition. They stated
that they enjoyed the activities, and believed that they learned more
during activity-based instruction. However, authors argued that in
both teaching conditions students' achievement for vocabulary learn-
ing was low. It is suggested that vocabulary enhancement strategy
should be incorporated with the activity-based instruction to help stu-
dents to learn more vocabulary.

Palincsar, Magnusson, Colllins, & Cutter, (2001) investigated the
effects of guided inquiry based teaching approaches in inclusive class-
rooms of concepts related to science and mathematics. The results of
the study indicated that students with and without disabilities signifi-
cantly increased their understanding of specific science and mathe-
matics concepts. In addition, low-achieving students and students
with special needs demonstrated changes in their understanding of the
concepts that were comparable to their general education
counterparts.

CONCLUDING STATEMENTS ON INQUIRY TEACHING: Effectiveness of
inquiry based teaching have been heavily investigated in general sec-
ondary education science (Ertepinar & Geban, 1996; Saunders &
Shepardson, 1987), earth science (Mao & Chang, 1998), mathematics
(Basista, Tomlin, Pennington, & Pugh, 2001), and social studies
(Otieno, 200). Researchers have also investigated the effectiveness of
inquiry teaching methods in both inclusion and general education
classrooms (Howe, 1998, Palincsar et.al. 2001, Scruggs, Mastropieri,
Bakken, & Brigham, 1993), and found that that inquiry teaching
increased the academic success of students with and without disabili-
ties. Creating an effective learning environment in inquiry classrooms
can be easily achieved by using variety of materials. For example, fish,
ants, and mealworms can be easily kept in classrooms to teach stu-
dents the life characteristics of these animals. Plants can be used to
investigate photosynthesis. Similarly, rocks can easily be obtained and
studied (Howe, 1998). To increase students' reading and comprehen-
sion skills, teachers can bring novels, articles, journals, and books to
the classroom and use the inquiry teaching approach to teach certain
concepts. For physics courses, small cars and ramps in different
shapes can be used to teach velocity. For geometry, teachers and stu-
dents can bring materials with different shapes such as glasses, balls,

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marbles, rulers, and earth spheres to the classroom and implement the inquiry teaching approach.

DISCUSSION

This literature review outlines empirical studies documenting effective academic interventions for use with secondary students with learning disabilities. As students with learning disabilities increasingly are being educated in the general education settings, while special education teachers continue to work in self-contained settings, general education teachers are finding their preparation to work with students with disabilities inadequate (Conderman & Katsiyannis, 2002; York & Reynolds, 1996). They report needing training in several crucial areas, including adapting curriculum (York & Reynolds, 1996). This review offers interventions that can be implemented in a variety of instructional settings in order to facilitate students' academic performance. The interventions fall in one of six categories: (a) mnemonic instruction, (b) graphic organizers, (c) guided notes, (d) classwide peer tutoring, (e) coached elaboration, and (f) inquiry teaching. The following Table summarizes the characteristics of each academic intervention.

Vaughn, Gersten, & Chard (2000) note that "critical variables that influence intervention effectiveness are the use of strategies used to enhance task persistence and the moderation of task difficulty" (p. 108). Mnemonic instruction is designed to address task difficulty while simultaneously allowing all students to acquire the same content. Because such instruction has been shown to facilitate knowledge acquisition, memory, and recall, students with disabilities can experience immediate success and also improve their performance on tasks that may require them to use the acquired information in the future.

Graphic organizes can be seen as "procedural facilitators or strategies [used to] guide [students'] learning activities" (Vaughn et al., 2000, p. 108). Repeatedly, research on students with learning disabilities has shown that they have difficulty organizing academic tasks, and internalizing and responding to cues from readings (e.g. using headings in texts to guide reading and note taking). They may have the knowledge necessary for an academic task but be unable to organize it in a meaningful way (Vaughn et al., 2000). Graphic organizers give students an explicit tool that demonstrates how such con-

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Table 1. Summary of Academic Interventions

Interventions	Rationale	Relevant Research Findings	Recommendations/Conclusions
Mnemonic Instruction	Help students remember and retain information that is difficult to recall.	Students recalled more attributes (Scruggs, Mastropieri, Levin, and Gaffney, 1985) Increased students' conceptual understanding and students remembered more information (Scruggs & Mastropieri, 1992) PLEASE strategy improved students paragraph writing skills (Welch, 1992)	• Address task difficulty while allowing all students to acquire the same content • Facilitate knowledge acquisition, memory, and recall • Increase students' immediate success as well as allowing them to use the acquired information in the future
Graphic Organizers	Help teachers and students organize concepts into visual representations by constructing graphs, charts, and diagrams that share important information about a concept or concepts	Increased students' academic achievement (Bulgren, Schumaker, & Deshler, 1988; DiCecco & Gleason, 2002; Doyle 1999; Horton, Lovitt, & Bergerud, 1990)	• Easily modified to ○ teach concepts from different subject areas ○ elicit students' prior knowledge ○ summarize and/or review concepts ○ assess students' understanding • Facilitate students' understanding and learning providing visual representation of concepts in any subject area.
Guided Notes	Help students get standard set of notes for future reference (e.g., tests, quizzes, etc.)	Students retained more information (Hamilton et al. 2000) Increased the accuracy of students' notes improved session quiz scores (Sweeney, Enhardt, Gardner, Jones, Greenfield, & Fribley, 1999) Increased students' academic achievement Lazarus (1991a and 1993b)	• Eliminate the possible students' frustration, lack of motivation, and off-task behaviors that may exist due to poor note-taking skills

Table 1 (continued)

Interventions	Rationale	Relevant Research Findings	Recommendations/Conclusions
Classwide Peer Tutoring	Help students gain academic and social behavior necessary for academic achievement	Increased academic success of students (Maheady, Sacca, & Harper, 1987) PALS program improved students' reading comprehension (Fuchs, Fuchs, & Kazdan, 1999)	• Establish supportive interaction with students' teachers and classmates based on their needs • Improve academic performance both mentally and socially • Decrease off-task behaviors
Coached Elaboration	Help students make reasonable links between current knowledge and new knowledge through the use of teacher questioning	Students remembered correct explanations of the information and increased their academic success (Anderson & Yilmaz, 2002b; Mastropieri, Scruggs, Hamilton, Wolfe, Whedon, & Canevaro, 1995)	• Allow teachers to promote critical thinking • Increase active student involvement • Promotes independent learning
Inquiry Teaching	Help students master concepts from various academic subject areas through investigations	Increased students' academic success (Palincsar, Magnusson, Colllins, & Cutter, 2001; Scruggs, Mastropieri, Bakken, & Brigham, 1993)	• Increase students' active involvement • Students to make connections among new concepts and what they already know • Students learn how to search for knowledge that will satisfy their curiosity about that subject area

nections can be made and allow them to use background and acquired knowledge to complete tasks more independently.

Guided notes involve the use of teacher-prepared handouts that give students cues and defined spaces in which to take accurate notes. Guided notes can aid students' performance by facilitating on-task behavior and giving students a standard set of notes to reference in the future.   Guided notes serve as a structure to organize knowledge as well as to help students break down academic tasks (e.g. reading a chapter from a text) that may seem overwhelming to students with disabilities. Like graphic organizers, guided notes assist students in "guiding learning activities." More than just facilitating textual comprehension, the notes aid in memory and improve academic success even on later assignments. This benefit is crucial, as deficits in memory and recall are some of the hallmark characteristics of students with learning disabilities (Hardman, Drew, & Egan, 2002).

Classwide peer tutoring clearly improves academic engagement, a necessity for any intervention for use with students with learning disabilities. Enhanced engagement has been shown to be related to improved academic outcomes, and improved motivation has been linked to increased task persistence. Peer tutoring is an ideal intervention in that it provides the opportunity for appropriate, supportive interactions with both peers and teachers, improves their academic and social performance, and can decrease off-task behavior.

Both coached and provided elaboration bring essential elements of effective instruction for students with learning disabilities into the classroom. Both facilitate metacognition and the development of self-questioning techniques that have often been found to be deficient in individuals with learning disabilities (Hardman et al., 2002). When such strategies become internalized, students are able to apply them in other settings (Vaughn et al., 2000). These techniques encourage students to become independent thinkers and learners, a goal that is universal to both general and special education.

Inquiry teaching, like classwide peer tutoring, can enhance academic achievement by providing activities that are motivating to students while encouraging appropriate interactions with peers. The three types of inquiry offer choice based on type of activity and/or stu-

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dent ability level. The use of this method is supported by research
which has shown students with learning disabilities to show improved
achievement when presented with multiple or alternative ways to
acquire information (Hardman et al., 2002).

CONCLUSION

There are several limitations to the research mentioned in this study,
and to the practical application of that research. First, several of the
interventions have been investigated with specific populations or in
specific content areas. For example, much research has been done on
inquiry teaching for general education students, and in specific con-
tent areas such as science and mathematics. Less is known about the
use of this strategy in areas such as language arts. Second, some
research has questioned the effectiveness of some of these interven-
tions. For example, in a review of 18 meta-analyses on interventions
for students with disabilities, Lloyd, Forness, and Kavale (1998) did
show mnemonic training to be highly effective, but the results of other
interventions, including cognitive self-management (such as use of
graphic organizers) and peer tutoring, were mixed. The authors con-
clude that more research is needed in order to substantiate the effects
of these interventions. Third, research has shown that, when general
education teachers do make the effort to include such interventions in
their classrooms, they generally do not do so in such a manner that
results in significant academic growth for students with disabilities.
Researchers found that general education teachers typically use
whole-class strategies and may not implement strategy instruction
consistently on the kind of long-term basis that is beneficial for stu-
dents with disabilities (Kauffman, 1999; Scanlon et al., 1996). In
spite of the few limitations, we believe that the interventions shared in
this review give new teachers and veteran teachers a starting point
regarding their responsibility of teaching students with learning dis-
abilities in general education classrooms.

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