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Enhancing Learning Through the Use of Graphic Organizers:
A Review of the Literature

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Anne Ford (2007) once said that “learning disabilities cannot be cured, but they can be treated successfully” (p. 1). Can teachers actually treat students with learning disabilities successfully? Is there a tactic that teachers can employ to aid students understand and grasp content? Years and years of research have indicated that students with learning disabilities (LD) face significant challenges in comprehending and organizing information from text. Students encounter greater difficulty at the advanced reading stage (reading to learn) because there is an increase in the amount of information in the content areas that they are expected to master (Gajria, Jitendra, Sood and Sacks, 2007).

One of the problematic areas for children with learning disabilities is the manner in which textbooks are written. Very often textbooks are written above student’s reading level and lack explicit organization of concepts. As a result, students are unable to make sense of vocabulary, text patterns and structure. They are faced with the ultimate challenge of extracting meaning from text/content. This is where graphic organizers come to the rescue. Gajria et al. (2007) elaborated that graphic organizers make material that are difficult to understand more accessible to students with learning disabilities. This technique “helps students understand where they have been, where they are and where they are going to on their journey through content” (Boudah, Lenz, Bulgren, Schumaker & Deshler, 2000, p. 2). In short, graphic organizers present concepts in a memorable way that can significantly enhance student’s comprehension of information as well as acquisition of content in subject areas such as Social Studies and Science.

According to Meyen, Vergason and Whelan (1996) graphic organizers are “visual displays teachers use to organize information in a manner that makes information easier

to understand and learn” (p.132). There are several types of graphic organizers. Some examples include semantic maps, cognitive maps, story maps, concept maps, Venn diagrams and unit organizers. Researchers agree that graphic organizers are effective tools that can improve student’s performance in content areas. Therefore, this paper will delve into answering the following questions:

1. How do graphic organizers enhance comprehension?
2. How can graphic organizers enhance the acquisition of content in Social Studies?
3. Why use graphic organizers in Science?

The paper ends with a discussion on the implications of findings, a brief summary and the reviewers’ assessment of usefulness and benefits of graphic organizers in enhancing comprehension and acquisition of content.

How Do Graphic Organizers Enhance Comprehension?

Over the past thirty years, reading comprehension has been one of the major foci of research. Williams (2005) acknowledged that “children with learning disabilities often experience severe problems in comprehending ... texts despite decoding skills” (p. 8). To ameliorate this problem, teachers can provide comprehension interventions through the use of semantic maps, concept diagrams and story maps.

Semantic maps are visual devices that students can use to derive implicit and explicit meaning from ideas, concepts and details in text (Boyle & Weishaar, 1997). This strategy increases students’ understanding by helping them acquire, maintain and organize information. One way that this strategy can be used, is by presenting students with a completed semantic map depicting the key words and concepts of a passage. They should then read each paragraph. After finding the main ideas in the passage, students

should link these key ideas to those on the map. This *modus operandi* provides the scaffolding that students with LD require. Research indicates that “semantic maps ... outperformed conventional reading techniques on comprehension tests” (Kim, Vaughn, Wanzek and Wei, 2004, p. 112).

In addition, the use of semantic maps enables students to focus on key vocabulary and concepts that will enhance reading comprehension. When using this strategy, teachers should activate student’s prior knowledge. For instance, in teaching the concept “whales”, teachers can trigger background knowledge by showing a video on whales and then allowing students to suggest key words that relate to the topic (See Appendix I). Students can actively participate in creating a semantic map that depicts major concepts being studied. A research synthesis conducted by Kim et al. (2004) illustrated that semantic organizers when compared to other instructional strategies (e.g., dictionary instruction) significantly improved comprehension skills of students with learning disabilities.

Another effective graphic organizer that can be used to improve comprehension skills is concept diagrams. Concept diagrams visually present the relationship among concepts. According to Cesarone (2007), concept diagrams are “chart-like graphic that describes a concept and its various relationships, with general concepts at the top, supporting concepts at the bottom, and lines showing the connections between the concepts” (p. 191). This method enables students to add new information to existing schema. Cesarone (2007) recommended that concept diagrams be used with students with LD, as these students encounter tremendous difficulty in expressing and linking ideas. Moreover, this technique can be used to evaluate students understanding of information, by asking

students to create their own concept diagrams. This would enable the teacher to see “misdirected links or wrong connections” (Helfgott, 2007, p. 1). Helfgott (2007) elaborated that concept diagrams provide an “accurate, objective way to evaluate areas students have not grasped” (p. 1). The multiple ways that this strategy can be used to increase comprehension makes it a necessary tool in all classrooms.

Furthermore, concept diagrams allow students to focus on pivotal concepts necessary to enhance comprehension. It facilitates understanding of definitions, characteristics and uses of concepts (Vaughn & Edmonds, 2006). The following procedures can be used when implementing concept diagrams. After reading a passage, students are presented with a blank concept diagram. The teacher explains the various parts of the diagram; and together (both teacher and students) highlights the principal concepts in the passage. This can be done through overt modeling. Students can be prompted to furnish instances and non-instances of the concept. This will facilitate active involvement as they write the concepts on the diagrams (Vaughn & Edmonds, 2006). An example of a concept diagram can be seen in Appendix II.

Finally, the use of story maps has been proven effective in improving reading comprehension with students with learning disabilities. This strategy allows students to systematically identify important story elements such as characters, plot and setting. DiCecco and Gleason (2002) stated that story maps improve students’ literal, interpretative and applied comprehension skills. They elaborated that this method assists in learning new vocabulary as well as recall information from a story. In fact, it helps students pay attention to important parts of a story. One way to use this approach is by the teacher reading a story and stopping at strategic points. Each stop contains questions

that will aid students in identifying the relevant parts of the story. Students should be provided with immediate feedback as to help them understand new information correctly. Story maps activate prior knowledge before reading, help student monitor comprehension during reading and summarize key ideas after reading. It is an instructional device that reconstructs and builds schema. An example is provided in Appendix III.

In addition, story maps assist students in integrating previous knowledge with existing knowledge (Keel, Dangel & Owens, 1999). This method connects the elements so that students can better understand the beginning, middle and end of a story. Sorrel (1990) stated that story maps help students clarify concepts, make predictions and summarize key points. As a result, students are better able to give more comprehensive explanations of the setting, characters, plot, problem and resolution of a story. A study conducted by Idol (1987) reported that poor readers were able to successfully use story maps in identifying the elements of a story. This suggests that story maps are effective tools that can enhance students' comprehension skills.

Studies show that graphic organizers, such as semantic maps, story maps and concept diagrams, are effective tools in improving comprehension of students with LD (Boulineau, Fore, Hagan-Burke and Burke, 2004; Kim et al., 2004). These graphic organizers go beyond assisting in the acquisition of information but also help students to develop, maintain and generalize skills (Boulineau et al, 2004). Research has shown that teachers who use graphic organizers can significantly improve comprehension skills of students with LD (Bulgren, Deshler & Lenz, 2007). Therefore, educators must consider the use of graphic organizers as a means of aiding students derive meaning from text (Duke & Pearson, 2002).

How Can Graphic Organizers Enhance the Acquisition of Content in Social Studies?

There is considerable evidence that graphic organizers are ideal methods for presenting large amount of data in a simplified manner (Gallavan and Kottler, 2007). Because of the magnitude of concepts in Social Studies, many educators struggle with presenting ideas in the specified period of time. Research shows that limited time equates to limited achievement. Therefore, graphic organizers are efficient ways to maximize engage time and thus increase learning in Social Studies. Gallavan and Kottler (2007) noted that “students become more motivated, demonstrate faster short term recall and greater long-term achievement when [graphic] organizers are used effectively in Social Studies” (p. 117). Social Studies lessons become more authentic and practical as students make relationship among concepts. This empowers them to be strategic learners and independent thinkers. They are able to make reasoned and informed decisions, share ideas and thus achieve the goal of Social Studies; which is, to become competent members of society.

According to Gallavan and Kottler (2007), there are several graphic organizers that can be used to enhance Social Studies content (p. 118-119). They include:

- ❖ Assume and Anticipate- This triggers background knowledge and interest and thus gets students involved in the learning process. (Appendix IV- A)
- ❖ Position and Pattern- It assists students in seeing connection between ideas and hence identify cause and effect relationships. (Appendix IV- B)
- ❖ Group and Organize- It uses smaller ideas to generate big ideas as students analyze and synthesize concepts. (Appendix IV-C)

- ❖ Compare and Contrast- It relates concepts, highlighting the similarities and differences among ideas. (Appendix IV-D)
- ❖ Relate and Reason- This helps students develop deductive and inductive reasoning skills. (Appendix IV-E)
- ❖ Identify and Imagine- It encompasses students naming as well as using cognitive skills (from all levels) to understand concepts. (Appendix IV-F)
- ❖ Estimate and Evaluate- This assists students in extrapolating, explaining, differentiating as well as giving different perspective on issues. (Appendix IV-G)
- ❖ Combine and Create- Students develop creative skills by actively engaging with material and creating their own concept maps for key ideas discussed in the class. (Appendix IV-H)

Graphic organizers make learning Social Studies content manageable. This technique teaches students how to focus on the critical concepts by organizing and summarizing key ideas.

During Social Studies lessons, graphic organizers can be used in an unlimited number of ways. They can be used across the learning stages as well as individually and in large groups. Ellis (2004) highlighted several steps that educators can employ when using graphic organizers. They must first explain how the organizer is used. In this way, students will learn about both how content is organized and how the graphics work in these visual strategies. Then, there must be modeling on how to use the method, followed by guided practice. Guided practice can be done in several phases. First, students practice as an entire class. Here the teacher and all students give ideas on how to complete graphic organizer. Second, there can be small group practice, where students learn from their

peers. Lastly, students work with the organizer on their own but get assistance when needed.

After using the graphic organizers, students will be ready to engage in independent practice. Here, students have mastered the skill, and can complete and/or create graphic organizers on their own. Teacher must follow this sequence for each format introduced. However, it must be noted that graphic organizers must not be overused as they can create boredom. Alternative formats must be used to keep students interested in the Social Studies lesson. Ellis (2004) claimed that graphic organizers are powerful ways to evaluate student's understanding of content. Therefore, if this visual technique is used sparingly and effectively, Social Studies teachers should expect to see positive gains in students' acquisition of content and thus, in school achievement.

Why Use Graphic Organizers in Science?

The teaching of Science is a rather challenging task for many teachers (Sorgo, 2006). This is so for many reasons. First, Science is a subject pregnant with abstract concepts, units of measurements, graphs, experiments, application of ideas and practical activities. Learning isolated facts do not equip students with the skills necessary to be successful at the Science lesson. Because concepts are interrelated, content may seem overwhelming to students with learning disabilities. Second, many students enter the Science classroom with preconceived notions of what things are and how they work. Science is all around us and so this frequent encounter of concepts leads to the development of many misconceptions. These misconceptions are based on cultural beliefs, commercials, personal interpretations and religious beliefs. Third, science textbooks contain difficult vocabulary and puzzling explanations of concepts that make

them problematic to comprehend (Kinniburg & Shaw, 2007). One way teachers can combat these problems is through the use of graphic organizers.

Shmaefsky (2007) explained that graphic organizers such as concept maps enhance the acquisition and application of scientific skills. A concept map gives a visual picture of the relationship among concepts (See Appendix V). It stimulates students' prior knowledge and thus leads to authentic, meaningful learning. This approach assists students in conceptualizing and remembering factual information. Moreover, it can be used as a learning strategy where students solve problems inductively and deductively, actively think through task, and apply information to everyday situation. Because this visual strategy can accomplish all those science goals in a relatively short period of time, it should be implemented in Science classrooms.

Mautone and Mayer (2007) agree that concrete graphic organizers can assist students in organizing and making relationships among ideas. This strategy makes the information less vague and ambiguous. It helps students focus on relevant details. As Ellis (2004) noted it "reduces the cognitive demand on the learner" (p. 1). Thus, the use of graphic organizers increases the likelihood that students will retain the information presented. The ripple effect is that there is more time for learning. As students are bombarded with less data, more time is available to process new concepts. Consequently, students can become more reflective and goal directed learners. The probability of being successful at the learning task is enhanced. Success breeds confidence, and confidence leads to increase attempts at difficult tasks. Science lessons include perseverance and inquiry skills. It can be concluded that graphic organizers help develop skills that may create tomorrow's scientists.

Ellis (2004) explained that graphic organizers help students become strategic learners. This is the ultimate goal of teaching. As students learn new concepts and try to make connections, they develop higher order thinking skills. In Science classes, these skills are critical in planning and conducting experiments as well as in investigating issues. Additionally, graphic organizers present content in a combination of ways- visually, orally and aurally. This multiple presentation mode engages more students in the Science lesson. Science class is filled with authentic experiences such as how home appliances work, how the body functions, and the phases of the moon. Hence, graphic organizers equip students with ways to understand and use resources in their environment efficiently. Students will be better equipped to tackle today's challenges as well as those that await them in the future. The use of graphic organizers helps students access Science information and maybe create a greater love for the world we live in.

Hutchison and Padgett (2007) noted that "great teaching is artful when students get information into their memory in an organized fashion to facilitate later retrieval" (p. 69). Graphic organizers help achieve just that. Moreover, it assists students in dispelling misconceptions; discovering meanings from difficult scientific words and formulating connections between ideas. Science education is complex but graphic organizers simplify it. The No Child Left Behind (NCLB) act requires that science skills and knowledge be tested (Kinniburgh & Shaw, 2007). Therefore, teachers should make use of graphic organizers because of its multiple benefits. This strategy motivates students to want to learn Science and thus create a love for the subject. Graphic organizers follow on Ausubel's (1960) theory of how learning takes place. However, educators must use this

strategy with caution as Hutchison and Padgett (2007) warned “a graphic organizer is only as powerful as its creators is capable of making it clearly capture the facts” (p. 72).

Discussion

The literature review supports the assertion that graphic organizers are scientifically based and empirically validated tools that “facilitate(s) learning for most students in ... reading comprehension and content areas across a wide range of ages, grades and learning abilities” (Ellis & Howard, 2007, p.1). Graphic organizers are valuable instructional instruments that improve learning no matter the cognitive maturity, learning style or experience of the learner. The literature showed that when students are using graphic organizers, they tend to be motivated and thus better assimilate novel information and complete complex tasks (Ellis, 2004). Therefore, educators should make a concerted effort to use this priceless method as to cater for individual differences, abilities and preferences. However, the effectiveness of instruction will depend on teachers’ skills and knowledge in the development and use of graphic organizers (Hutchison & Padgett, 2007). Maximum gains can only be derived if teachers are equipped with the ability to use the strategy.

Another implication for teaching is that graphic organizers cater to learning taking place across modalities. This strategy lends itself to students creating, manipulating, visualizing, recording, recalling, and expressing understanding of concepts. It activates the learner’s cognitive skills, while at the same time triggers the use of tactile and visual abilities to make sense of information (Ellis & Howard, 2007). Graphic organizers not only improve comprehension but allow students to connect diverse and comprehensive text in a stratified and simplified manner. Upper grade level teachers

serve to benefit greatly from the implementation of this technique because it provides them with a way to teach lots of content in a fun and productive way (Gallavan & Kottler, 2007). The literature revealed that teachers of both Social Studies and Science have used graphic organizers to condense content to produce great improvement in the acquisition as well as the maintenance and generalization of concepts.

Additionally, graphic organizers cater to the multi-faceted classroom as it enhances teacher instruction plus student performance. This strategy provides instant feedback (DiCecco & Gleason, 2002). As a result, teaching can be modified to suit learner's needs and so allows educators to be reflective. Also, many studies on the use graphic organizer in the classroom have shown that it can lead to positive gains for students (Boulineau et al., 2004; Gallavan & Kottler, 2007). It moves instruction from teacher-directed to student-directed. Students learn how to derive meaning from text, how to focus on key points and how to connect ideas. In short, it can help to teach children metacognitive skills that can be applied to various situations. Consequently, it is incumbent on educators to use such a strategy that will not only maximize engaged time but also develop independent learners.

The literature on graphic organizers has been very encouraging in improving students' comprehension, acquisition and maintenance of information in content areas. Studies continue to reveal remarkable improvement in students' performance when graphic organizers are used (Boulineau et al, 2004, Gajria et al, 2007). Thus, the reviewers strongly believe that graphic organizers are effective instructional methods that should be implemented in the classroom. The reviewers hold this belief because of the key points highlighted in literature. This technique is a motivational tool that gets

students actively involve in the learning process. Even when content seem difficult, this technique captivates students' attention and interest, thus motivating them to remain on task (Gajria et al, 2007).

In addition, graphic organizers help students to maintain content even after instruction has ended (Boulineau et al., 2004). One of the key components of effective instruction is that students are able to acquire, become proficient, maintain and generalize what is learned. Graphic organizers meet these criteria perfectly. Boulineau et al. (2004) acknowledged that graphic organizers teach across the learning stages. Because of the numerous benefits, educators should use this strategy especially with students with learning disabilities as they encounter great difficulties at the latter part of the learning stages.

Another implication is that graphic organizers are instructional methods that are very flexible and cost effective. They can be computer-generated or teacher-made or student-made (Boyle & Weishaar, 1997). However, teacher and student-made organizers are not only fun but fosters creativity in both teachers and students. Everyday materials can be used during the creation process. Students not only learn concepts but other skills, such as recycling and maximizing resources. Hence, graphic organizers develop the whole child. This would comply with Heward's (2003) definition of creativity in which teachers develop materials and activities that will lead to learning. The creation of graphic organizers allows educators to strategically monitor and analyze student's interaction with text (Helfgoft, 2007). As a result, enables them to intervene before the development of misconceptions.

The researchers believe that graphic organizers are great tools for remembering information and an excellent technique that can assist students with learning disabilities, especially secondary school students. Gajria et al. (2007) agree that students with LD can benefit from graphic organizers as many, often are unprepared to access information independently. Teachers must therefore use effective strategies to improve performance of all students. As Engelmann (1992) correctly stated:

teachers are in the classrooms as professionals to do a job; children are not in the schools to be pawns for educators who want to try one unproven method after another because of fad, fashion or creative whim (as cited in Heward, 2003, p.197).

Therefore, graphic organizers consistently have been proven to be effective. It has highlighted that quantity of content is no deterrent to learning. Research studies have proven this method is effective, teachers have proven that it works and students have proven that they learn from it. Thus, the question lies with the reader- What else must be said? What more do teachers need? Graphic organizers can unlock many doors.

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APPENDIX I

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APPENDIX II

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APPENDIX III

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APPENDIX IV

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