University of Nevada, Reno

Teachers' Reported Use of and Perceptions About Graphic Organizers in High School Content Area Classrooms

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requirements for the degree of Doctor of Philosophy in Education

by

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Abstract

This study explored the opinions of teachers regarding use and effectiveness in the use of graphic organizers in their classroom instruction. Data collection and analyses sought to determine if participating teachers used graphic organizers in their classrooms and how effective teachers perceived graphic organizers to be in the areas of English/language arts, social studies, science, and math.

A descriptive statistical study was conducted using a survey emailed nationwide. Quantitative methods of data collection, including a questionnaire, were used to gauge teachers' attitudes and uses of graphic organizers in their classrooms. The majority of teachers surveyed indicated they were aware of graphic organizer use and effectiveness in the classroom. Future research topics and recommendations were summarized regarding the use of graphic organizers by teachers in the high school content classrooms.

Key Words: *Advance Organizers, Graphic Organizers, Instructional Strategies, Cognitive Psychology, Meaningful Learning, Rote Learning, Assimilate*

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Teachers' Reported Use of and Perceptions About Graphic Organizers in High School Content Area Classrooms

In order to facilitate learning for students, teachers must continually develop, adapt, and refine their instructional approaches, using those practices established by research as being effective. Teachers help their students master information in various course materials and at the same time assist in generalizing literacy and math skills in all content area classes (Perin, 2006). Effective teachers must consider which components of the curriculum are integral to improving learning. There are many learning strategies available that are have been demonstrated as effective in facilitating instruction and cognitive learning. These strategies provide content in such a way as to teach students how to acquire academic skills and how to use the information to solve problems in a variety of academic settings.

Graphic organizers are one class of instructional strategies with a strong base of research in that they support student learning, application, and generalization. They have a variety of descriptions and identifications, such as advance organizers concept maps, mind maps, cognitive organizers, or concept diagrams, to name just a few (Bulgren, Schumaker, & Deshler, 1988; Darch, Carnine, & Kammenui, 1986). Graphic organizers use two-dimensional space to communicate concept relationships through the spatial display of textual information (Robinson, Katayama, & Fan, 1996). They make use of these visual representations to assist instruction and learning by supporting students in activities such as planning, compare and contrasting, timelines, and illustrating sequences of events (Gregory & Chapman, 2002). When students learn something new, they must be able to retain the information for later use. Knowledge is stored in a scaffolded

hierarchy as a way of organizing information. According to Slavin (2011), people encode, store, and retrieve learned information based on hierarchy. Graphic organizers show students the relationships between prior knowledge and new concepts presented as part of the core subject instruction and they also provide a visual road map of the material presented (Slavin, 1991). Graphic organizers are an excellent instructional tool to teach retention and recall of information and help students connect ideas and bridge the gap between reading the words and understanding the content material. When students relationships between concepts or between subject areas (such as math and science), they become more motivated (Banikowski, 1999). According to Alvermann and Boothby (1986), students with graphic organizers to study with their text perform better when recalling concept relations.

A teacher's perception of instructional strategies, such as graphic organizers, and their effectiveness on student learning determines the frequency of their usage in the classroom (Wozney, Vivek, & Abrami, 2006). The use of graphic organizers has been reported in the professional literature for over 40 years, yet the extent of use of graphic organizers in the high school curriculum or how teachers perceive the effectiveness of graphic organizers in supporting student learning in academic areas has not been determined. Interest in discovering effective strategies that improve content knowledge and identifying instructional strategies in specific disciplines, especially graphic organizers, led to the researcher's initial interest in conducting the current study.

Purpose

The purpose of this study was to determine high school teachers' reported use of graphic organizers and their perceptions of the effectiveness of graphic organizers in

teaching the major content areas of English/language arts, social studies, math, and science. Information about teachers' approaches to instructional strategies in different disciplines is limited and additional research will provide useful information for teacher preparation, professional development, state or district policy, and development of curriculum materials.

Research Questions

The research questions for the current study include the following, with sub-questions following each:

1. What is the level of use of graphic organizers reported by high school teachers of English/language arts, social studies, math, and science?
    a. What proportion of teachers report using graphic organizers with their classes?
    b. What types of graphic organizers do they report using and to what extent?
    c. Is there a difference of reported use among teachers of English/language arts, social studies, math, and science in classroom instruction?
2. What is the perceived value of graphic organizers by those teachers who use them?
    a. Do teachers perceive that graphic organizers are particularly effective for certain populations of learners, such as students with learning disabilities, students with intellectual disabilities, students who are gifted, or students who are second language learners?
    b. What aspects of graphic organizers do teachers perceive as most valuable to student learning?
    c. How valuable do teachers believe each of four types of graphic organizers (concept oriented, web, mind-mapping, others) are in classrooms?

3. What factors may contribute to teachers' reported use of graphic organizers in instruction?

a. Where/how do teachers report learning about graphic organizers?

b. Do teachers believe graphic organizers that are included in textbooks effective in classroom instruction?

c. Is there a difference in the use of graphic organizers based on years of teaching experience?

Delimitations and Limitations of the Study

A major limitation was the accepted definition of a *graphic organizer*. The term, *graphic organizer*, can be general and advocates tend to refer to very different visual formats when they recommend the use of graphic organizers. The broadness of the term, *graphic organizer*, could lead to some confusion from the results of this study although examples will be provided for clarity.

This descriptive quantitative study used a survey instrument to examine the relationships among variables (teaching experience, content areas taught, teacher opinions, and attitudes toward use of graphic organizers) to answer questions concerning a sample of high school teachers throughout the United States who teach in the areas of English/language arts, social studies, math, and/or science.

This study, also, incorporated the application of descriptive and inferential statistical methods (Creswell, 2009) to describe trends found in the data and to develop a profile of teachers who reportedly use graphic organizers in their instruction and find them effective in promoting student learning, application, and generalization of new material.

Definitions of Key Terms

Advance Organizers – Information used by the student to interpret and organize new information (Mayer, 2008). Graphic organizers are a class of advanced organizers.

Graphic Organizers - A visual display that connects relationships between facts, terms, and ideas within a learning subject. Graphic organizers are referred to by a variety of names depending upon what area is presented (Hall & Strangman, 2005). (See Appendix E).

Instructional Strategies - A variety of methods and practices that encourage students to become independent and strategic learners.

Meaningful Learning - the concept that knowledge is fully understood by the learner and that the individual knows how that specific fact relates to other stored facts.

Cognitive Psychology - The branch of psychology where new concepts are incorporated and assimilated into existing knowledge (Ausubel, 1968). Ausubel's use of *cognitive psychology* is the belief learning takes place by the assimilation of new concepts and propositions into existing concept and propositional frameworks held by the learner.

Rote Learning -The use of repetition to learn information usually with routine and little understanding or cognition.

Assimilate - To take in and incorporate as one's own; absorb ("Assimilate," 2014).

Significance of Study

Research (Nahmias, 2010; Robinson, Katayama, Odom, Hsieh, & Vanderveen, 2006; Stull & Mayer, 2007) indicates that graphic organizers can be effective intervention tools to improve students' understanding of core subjects in high school. The current study has the potential to help professionals better understand the reported level

of use of graphic organizers among high school teachers of English/language arts, social studies, math, and science. In addition, it will add to the understanding of what types of graphic organizers are favored, the source of graphic organizers that teachers use, how graphic organizers may be used differently in different content areas, and the types of students whom teachers feel benefit from the use of graphic organizers. The current state of teachers' perceptions and reported use of graphic organizers will give insights to better facilitate the use of graphic organizers as an effective instructional practice for high school learners.

This report is divided into five chapters. In chapter two, the researcher establishes what is known about graphic organizers and their potential use by teachers by reviewing the foundational and research literature in two areas: (1) the theoretical basis for and research of the effectiveness of graphic organizers as instructional tools, and (2) the adoption of innovative or evidence-based instructional practices by teachers. This could have important implications for pre-service teacher preparation, as well as ongoing professional development for teachers. Chapter three describes the methodology used, while chapter four presents the results of the study. The implications and need for further research are discussed in chapter five.

Chapter 2

Literature Review

In this chapter, literature is discussed that provides the background for the research questions and sub questions of the current study. Specific goals of this study are to gain insight into high school teachers' perceptions and frequency of use of graphic organizers; to determine responding teachers' perceptions of how graphic organizers assist students in learning academic content; to determine some of the factors that may influence teachers' use of graphic organizers in their instruction; and how they may be used in different disciplines. Meeting these goals will help to describe the current level of adoption and use of graphic organizers by high school teachers. In addition, the current study could assist in identifying needs in teacher pre-service preparation and professional development as related to the use of graphic organizers as effective instructional strategies.

The foundational and research literature for this study is organized into three broad sections. The first section discusses the conceptual and theoretical framework that under girds the use of graphic organizers. This is followed by a review of research on the effectiveness of graphic organizers on student learning in a variety of subject areas. The third major section looks at what is known about how high school teachers use graphic organizers as part of their overall instructional responsibilities.

To locate relevant literature, the researcher searched data bases for pertinent theoretical articles and studies from peer-reviewed scholarly journals across a variety of subject areas. Topics searched included the following: graphic organizers; visual strategies; instructional strategies; teacher attitudes, viewpoints, and opinions regarding

instruction and preparation; frequency of use of graphic organizers; modeling; barriers to implementation of instructional strategies and graphic organizers; and teacher adoption of evidence-based practices.

Databases used included ERIC, ProQuest, JSTOR, PsychInfo, Sage Journals Online, and EBSCO (PsycArticles). Other publications or archives searched were resources from various states' departments of education, the U.S. Department of Education, and the Association for Supervision and Curriculum Development.

Theoretical and Historical Background of Graphic Organizers

A great deal of the theory behind the use of graphic organizers comes from the cognitive psychology literature. Cognitive psychology describes learning taking place when individuals adapt new concepts and prepositions into existing concepts (Novak & Cañas, 2008). This type of psychology focuses on how people acquire, process, and store information. American psychologist, Ulric Neisser, in his book, *Cognitive Psychology*, first used the term, *cognitive psychology*, in 1967. According to Neisser, cognition involves the way information is "transformed, reduced, elaborated, stored, recovered, and used" (p. 5).

The literature shows that cognitive theory has been linked to graphic organizers (Ausubel, 1968; Mowrer & Klein, 2001; Ormrod, 2008). According to Ives and Hoy (2003), these changes occur within conceptual understandings of learners subsequently affecting current and future learning performances (Hawk, 1986).

Ausubel (1968) noted that graphic organizers are connected with theory by placing the learner's insight of information into structures of hierarchy and importance. Robinson and Kiewra (1995) stated that graphic organizers could help students to

recognize and use concepts in a hierarchical website (Nilsson & Mayer, 2002). Based upon additional research by Ausubel (1968), cognitive psychology described the learning that takes place by incorporation or assimilation of new concepts into an existing theory. Gillani (2003) also noted the links between graphic organizers with the cognitive theory through their ability to apply assimilation and accommodation of new and previous learning experiences. As a result, learners develop more complex understandings to enable them to build upon further meaningful learning (Novak, 1998).

Research by Derry (1996) supported these connections specifically through the cognitive schema theory in which unique learning patterns processes new information are based upon individual learning schema in order to assimilate and accommodate new information effectively. Thus, the learners' individual schemata would reconstruct information that is stored into positive learning (Spiro, 1977). The literature discusses the links between graphic organizers and theories of conceptual learning when they are utilized as effective pedagogical tools in the engagement of students resulting in the accommodation and assimilation of important concepts (Robinson & Skinner, 1996).

Graphic organizers could aid in the comprehension of important concepts such as English language learning, vocabulary, and mathematics, which may promote student self-efficacy and self-regulation (Chularut & DeBacker, 2004; DiCecco & Gleason, 2002; Ives and Hoy, 2003). They may help students in establishing early schema in these areas, which is important in the early stages of conceptual learning (Novak & Cañas, 2008). As a pedagogical tool, graphic organizers could enhance student knowledge and reduce the complexity of that knowledge through meaningful learning (Nilsson & Mayer, 2002; Stull & Mayer, 2007). This may be accomplished by their ability to increase cognitive

knowledge capacity in the working memory capacity by affecting the processing and storage of that knowledge (Chularut & DeBacker, 2004; Doolittle, Terry, & Mariano, 2009; Unsworth & Engle, 2007). Graphic organizers and how they help as a pedagogical tool in the connections of presenting new information to stored information will be discussed in the following areas.

The use of graphic organizers and their relationship in the presentation of information is a factor to be considered in student learning. They could affect student capacity to connect information and integrate it with the application of that information (Robinson, Katayama, Odom, Hsieh, & Vanderveen, 2006). The research of Robinson et al. (2006) indicated how graphic organizers help students to quickly connect the relationships of prior and new concepts as opposed to just using the text.

Graphic organizers may help students to focus on new key information that is presented and the meaning of that information (Bera & Robinson, 2004) prior to learning new information and enhance the connections of that new information to prior learning (Schunk, 2008). Part of Ausubel's premise centered between the differences between meaningful learning and rote memorization. Meaningful learning occurs when a student applies a lesson and retains the knowledge through the relationship of the new information with previously acquired material. Rote memorization, on the other hand, is repetitive studying and a playback of facts (Ausubel, 1968; James, 1907; Piaget, 1970; Vygotsky, 1978). Researchers stated that teachers must understand individual learning styles and develop strategies to match learning tools to present concepts that help learners retrieve prior knowledge (Bekinschtein, Cardozo, & Manes, 2008).

Ausubel (1968) stated that, in order to be learned, material must have been clearly presented with language and examples linked to the learner's prior knowledge. The learner would then decide to make the concepts meaningful through use of knowledge already acquired combined with the newly learned material. Ausubel (1968) felt that learners are different in the quality and quantity of the facts they possess and in the strength of their desire to find ways to use the new information and incorporate it into existing concepts (Gross, 2007).

Ausubel's theory of meaningful versus rote learning suggested that meaningful learning intentionally attempted to incorporate new information, used a broader network, and created more means of retrieval of information (Ausubel, 1968). On the other hand, according to Novak (2002), rote learning does not assimilate new knowledge with existing knowledge. The goal of effective instruction is to emphasize meaningful learning instead of rote learning that is not incorporated into a learner's daily application of subject learning.

Ausubel's assimilation theory is the theoretical foundation for the use of graphic organizers in effective instruction. Graphic organizers assist student thinking about concepts, and the relationships between the concepts, when new information is presented and processed (Lee, Baylor & Nelson, 2005; Novak, 2002; Novak & Cañas, 2008; Zimmaro & Cawley, 1998). Graphic organizers support moving from rote skills to meaningful learning, and they can be used in successful presentation of classroom material (Novak & Cañas, 2008).

There are a large number of studies on the effectiveness of graphic organizers in textbooks, classroom instruction, and the area of assessment, especially for students in K-

6. Studies of the efficacy of graphic organizers are presented in the following section of this chapter.

Research on the Effectiveness of Graphic Organizers

In the discussion that follows, evidence is provided that indicates graphic organizers have the potential for nurturing learning in a variety of different areas in education. A recent case study indicated that these tools and techniques were effective with a female public middle school student with a learning disability who was an English language learner who had difficulty with reading comprehension (Miranda, 2011). A small group instructional setting was provided with the inclusion of two male public middle school students who were English language learners but did not have learning disabilities. From this study, graphic organizers were found to be an effective reading comprehension intervention by the teachers involved. When modeled by their teachers how to use graphic organizers, students with learning disabilities comprehension improved (Kim, Vaughn, Wanzek, & Wei, 2004). When used to improve reading scores, graphic organizers have the potential for nurturing learning in a variety of different subject areas in education.

When graphic organizers were used as an instructional strategy in a high school in San Diego, California, the students improved their low scores on standard tests, high dropout rate, and poor daily grades (Fisher, Frey, & Williams, 2002). The teachers and administrators made a commitment to improve reading and content area comprehension through use of the instructional strategies. The teachers modeled the strategies for the students, encouraged peer interaction, and there was a remarkable growth in scores, attendance, and achievement.

Graphic organizers were used with classroom discussions and to understand the texts. Students at the high school level consistently reported that the graphic organizer was the most helpful strategy out of the seven that were adopted for daily use. At the end of year, through the use of instructional strategies, students were more focused and retention increased and teachers were able to improve their teaching skills. Strategic teaching, through the use of graphic organizers, encouraged student learning which in turn lead to a positive impact on student outcomes across all subject areas (Fisher, Frey, & Williams, 2002). To look more closely at potential differential effectiveness of graphic organizers in high school academic content areas, research was reviewed that specifically studied the use of graphic organizers in the areas of language arts (and reading), math, social studies, and science.

Research on Graphic Organizers in English, Language Arts, Including Reading

Using graphic organizers assists students in making valuable connections in the English/language arts classroom. Designed for comparing and contrasting, Venn diagrams, t-charts, and other graphic organizers assist students in making connections between plots, themes and other elements of literature. Cause-and-effect graphic organizers assist students in illustrating how events in a story are connected, thereby improving their comprehension of a text (Praveen & Premalatha, 2013).

Among the key educational areas researched that are affected by graphic organizers are comprehension, reading, and vocabulary knowledge (Manoli & Papadopoulou, 2012). By connecting prior knowledge with new information gained from written text or lecture, learners can be involved on an active basis in reading through the

use of graphic organizers to summarize and to outline material to be mastered (Gajria, Jitendra, Sood, & Sacks, 2007; Manoli & Papadopoulou, 2012).

A research synthesis conducted by Kim, Vaughn, Wanzek, and Wei (2004) illustrated that graphic organizers when compared to other instructional strategies significantly improved comprehension skills of high school students. Of the 21 studies included in the meta-analysis, the use of graphic organizers in treatment-comparison studies was found to be related to large effect sizes across grade levels. This meta-analysis indicates that instruction on the use of graphic organizers, overall, can be an effective reading comprehension intervention with students.

DiCecco and Gleason (2002) researched how graphic organizers work together with the learning of factual knowledge from social studies texts for 24 students with learning disabilities in middle school. Pretest-posttest control group design was used for the study. For 20 months, the graphic organizer group and the control group were instructed in reading and summary writing. The independent variable in the study was how to use graphic organizers. The findings of the study indicated a statistically significant advantage for the recall of factual knowledge statements by the graphic organizer intervention group in comparison to the control group (DiCecco & Gleason, 2002).

Graphic Organizer Effects in Science

With the adoption of standards-based and common-core curriculum, science is now assessed as early as fourth grade area in some states. The type of reading, comprehension, and problem solving that is required for school-related tasks and texts in science involves not only the development of reading and writing skills, but also the

development of more abstract and more demanding vocabulary and language (Scarcella & Merino, 2005). The academic language of science and the required textbooks can be difficult for students because of the involved uses of technical words, complex grammatical structures, and a high density of information (Snow, 2010). Graphic organizers can be part of mastering science by assisting with content knowledge and the academic language of science.

In one high school, graphic organizers can prove student achievement in science when compared with guided note taking (Antoine, 2013). One classroom of 69 high school Biology I students were taught two body systems using graphic organizers, and in contrast two body systems were taught using a guided notes lecture. The two groups were tested with a pre and post test to determine if there was a difference between students using graphic organizers and those that used guided notes. Students using graphic organizers instruction were found to have significantly higher test scores. The use of graphic organizers seemed to promote more student success, better vocabulary skills, and retention of facts than the use of the PowerPoint (Antoine, 2013).

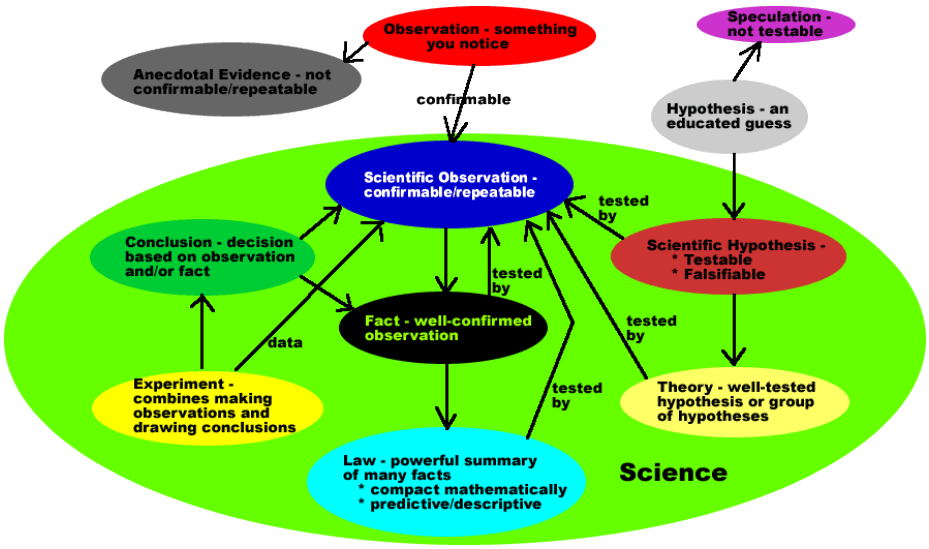

Figure 1, an example in science- Scientific Observation.

Provided with permission from the Public Schools of North Carolina, March 31, 2013.

Graphic Organizer Effects in Math

Graphic organizers are also effective in many areas of math. Students are able to show an alternative way beyond numbers of demonstrating their understanding of basic concepts. Graphic organizers assist students organize ideas, infer solutions to problems, and communicate their strategies, in addition to solving word problems.

In one action research study, the teachers studied the effects of graphic organizers on the math problems of nine students. The teachers administered pre- and post-tests with their students to see if the use of the box graphic organizer had an effect on their performance. Students' mathematics scores were reported by their teachers to have dramatic improvements using graphic organizer. The percentage of students (N=186) who scored at the *meets* or *exceeds* levels on each of the open-response item categories

on the pre-test was 4% for math knowledge, 19% for strategic knowledge, and 8% for explanation. After graphic organizer instruction, the percentage of students scoring *meets* or *exceeds* on the post-test improved to 75% for math knowledge, 68% for strategic knowledge, and 68% for explanation (Zollman, 2006a; 2006b).

Overall scores increased from a 27% average on the pre-test to a 70% average on the post-test. Data was collected, analyzed, and triangulated from three sources—the teachers, the action research pre- and post-test data, and the students' work. This results suggests that the use of the graphic organizer in mathematical problem solving may significantly help students coordinate a variety of mathematical problem solving (Zollman, 2006a; 2006b).

In research regarding visual and graphic representations of math problems, graphic representation of mathematical concepts and problems appeared in most commonly used textbooks (Gerstein & Clarke, 2007). Results from international studies in Singapore, Korea, and the Netherlands indicated graphic organizers are a crucial component of successful programs. The average effect size was 0.50; the effect sizes for individual studies ranged from 0.32 to 0.88. An interesting finding for the use of graphics and visual organizers in these studies stated the specificity of the visual representation determined the effectiveness of the graphic organizer intervention with math students, especially those with special needs (Gerstein & Clarke, 2007). Effects were larger when teachers presented visual examples of math problem-solving sets, and students practiced using their own graphic organizers with specific guidance by the teacher on which visuals to select and why.

In other studies of middle and high school students learning algebra and fractions, the use of graphic organizers were studied. The researchers used graphic organizers to teach successfully concepts and operations involving fractions (Butler, Miller, Crehan, Babbit, & Pierce, 2003) and basic algebra (Witzel, Mercer, & Miller, 2003). Manipulatives were used with students to introduce and understand the graphic organizers and representations of the math concepts. The benefit of this approach may be that its concreteness helped students maintain a framework in their working memory for problem solving of this type.

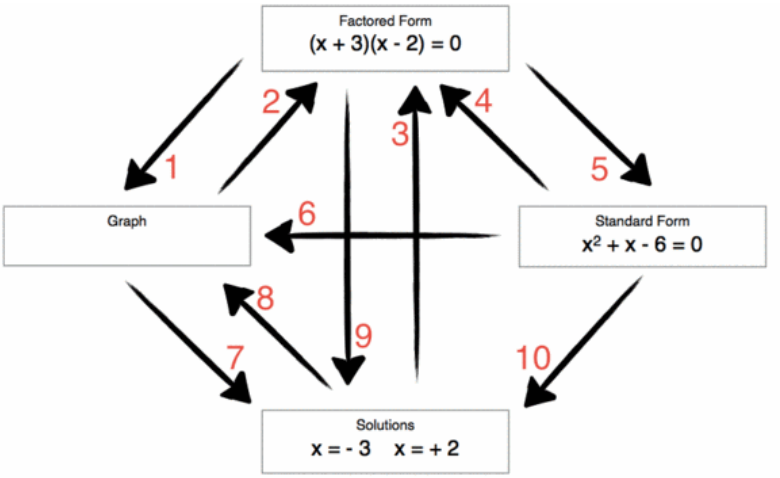

Figure 2. Digital Tool-Kit

Studies involving Social Studies

It is not easy to acquire the skills necessary to learn to read and students learn by various blocks in order to build the ability to read in K-3. While these blocks prepare the student for independent reading, many students struggle when they become fourth graders as the books become expository, with an emphasis on understanding, and remembering what was read through reading comprehension. Rarely in primary grades does a beginning reader come across expository texts to read. This is especially true of

social studies texts. Social studies textbooks have a definite expository pattern and structure (Chall, 1983; Chall, Jacobs, & Baldwin, 1990).

In a recent social studies study, case study research was conducted to discover the effects of graphic organizers to support students' understanding of informational text in social study areas (Fealy, 2010). Instruction included social studies content, reading comprehension strategies, and teacher modeling of compare/contrast graphic organizers during the course of the study (Ciullo, Falcomata, & Vaughn, 2014).

Six case studies were developed, and research was collected and analyzed. The major findings of this study were that students found graphic organizers useful, were able to independently use them, and learned new concepts about their informational text in social studies as a result of using graphic organizers (Fealy, 2010). The students reported that the graphic organizers assisted them with useful instructional strategies and improved readers. Thus, this research indicates the continual instructional benefits of graphic organizers as a means of scaffolding and supporting students' understanding of informational text as well as comprehending and generalizing the new material to be learned (Fealy, 2010).

Meta-analysis Studies

Dexter and Hughes (2011), using a meta-analysis methodology, reviewed experimental and quasi-experimental studies in which upper-elementary, intermediate, and secondary students with learning disabilities gained positive instruction from graphic organizers. They conducted an exhaustive search for studies that met specified design criteria, 55 standardized mean effect sizes were extracted from 16 articles involving 808 participants. Students at levels ranging from fourth grade to twelfth grade used graphic

organizers to learn in academic classes (English/reading, science, social studies, and math). The use of graphic organizers was associated with increased vocabulary knowledge, comprehension, and inferential knowledge. Mean effect sizes varied from moderate to large were based on type of measure, type of graphic organizer, and subject area (Dexter and Hughes, 2011).

Teacher Decisions Regarding Use of Graphic Organizers

Teachers are responsible for presenting curriculum and materials that enhance and improve student knowledge as they make decisions about the most effective tools to use daily in the classroom (Paek, Ponte, Sigel, Braun, & Powers, 2005). Teachers identify best practices coupled with research-based instructional strategies that in turn improve student understanding and academic improvement (Nahmias, 2010). In high school content area classes, teachers become accountable not only for subject areas but also making certain that literacy levels are high enough for textbooks and lectures to be understood. It is important for a content teacher to have an emphasis on concept and vocabulary development, student motivation, and strategic comprehension.

According to Nahmias (2010), effective literacy instruction, which included training students in the use of graphic organizers, in content area classes achieved these goals by creating an environment that centered on student learning. In one study, teachers responded that they felt strongly responsible for instructing vocabulary and assisting in comprehending course textbooks. The majority of the teachers surveyed indicated they taught how to use graphic organizers in their subject areas. When interviewed, the same teachers stated that the area of literacy competency was one of four of the most important areas of their instructional practice (Nahmias, 2010).

However, teachers also reported that they experience the dilemma of not having enough preparation or presentation time to cover their content area if they instruct literacy skills as well as their required subject. In addition, they felt that the preparation time was excessive when they would model the graphic organizer strategy for students who were not motivated or possessed weak study skills. Many of the teachers complained of lack of pre-service training in teaching reading content skills. The area most problematic for teachers in this study was the inability of students to understand and comprehend content area textbooks. Secondary teachers are extremely concerned about how to meet the varied literacy problems of their students (Zwiers, 2004).

Teachers that use graphic organizers recognize the many benefits of using them in the classroom. First, content understanding and instruction is assisted with graphic organizers. Textbooks and lectures present new subject information in intense forms with a multitude of facts, can be difficult to understand, and hard for the student and the teacher to detect where misunderstanding may be occurring (Gajria, Jitendra, Sood, & Sacks, 2007). It can be problematic for students to distinguish vital from nonessential information and graphic organizers assist students by providing visual cues and organization of important information. Graphic organizers reduce the processing skills necessary to acquire new material (Blair, 2010). They assist in connecting prior knowledge to the new information (Keel, Dangel & Owens, 1999).

Second, information becomes easier to comprehend because of smaller amounts of new material to be mastered (Blair, 2010). Teachers find that students who use graphic organizers learn how to become effective strategic users across content areas. Strategic learners have effective means, through strategies like graphic organizers, for planning,

executing, and evaluating a task (Deshler & Lenz, 1989). Organization of topics becomes clear when graphic organizers are used. Reading, writing, communication, and analytical skills improve. Graphic organizers may assist students to be independent learners as they act as supports with understanding and acquiring new information and assimilating the material with existing background knowledge. As students become more successful, motivation increases along difficult subject areas. This can lead to recollection, comprehension, and application of the information at a later time (Eison, 2010).

According to research, students' comprehension and application of critical thinking skills are improved through the use of graphic organizers (Praveen & Premalatha, 2013). Graphic organizers enhance students' critical thinking skills as they begin to understand how different subtopics connect to a topic as a whole. Some of the uses of graphic organizers include the ability to compare and contrast, analyze relationships, brainstorm problem areas, and explore concepts.

Graphic organizers help students with different learning styles, particularly logical and visual learners (Praveen & Premalatha, 2013). A graphic organizer can be used to outline the sequence of a story, in addition to identifying the main traits of a character, or record the conflicts that appear in the text. For example, a box with a character’s name may be placed in the middle of the graphic organizer and examples of the character's feelings, thoughts, actions and physical characteristics may be in boxes around the central name. This assists students in visualizing words and remembering key points of stories, such as themes, plots, and summaries. They can use graphic organizers to remember main facts to include in a research paper or an essay. Students can break down the writing

process into manageable steps, such as boxes for the introduction, thesis, main topics, and conclusion.

Summary

Theoretical and research literature are supportive of the use of graphic organizers in academic instruction. It is clear that graphic organizers improve and enhance students' learning ability across age groups. The true effectiveness of graphic organizers can be seen through the ability of teachers to use and apply to subject areas in order for students to learn how to efficiently utilize them with planning, organizing, prereading, and assessments.

Graphic organizers can be used to allow students to structure the most essential ideas while simultaneously removing any non-essential ideas from material presented. Both comprehension skills and vocabulary knowledge have also been proven to increase at a significant rate after using graphic organizers for visual learning. Through graphic organizers students will learn how to better organize their ideas so that they make break them down for increased clarity.

Although graphic organizers have proven to be extremely beneficial over all age groups, recent studies have begun to indicate that these tools and techniques are more effective in the high school setting than for elementary stages (Kim, Vaughn, Wanzek, & Wei, 2004). In order to maximize the potential benefits of the use of graphic organizers, instructors should instruct students regarding the relationships that exist between concepts outlined in the organizer and should establish a connection between currently learned material, and prior knowledge.

The effectiveness of graphic organizers in the areas of math, science, and social studies has not been well established, although evidence from studies of graphic organizers and reading comprehension indicate potential for those subjects with high demands for content area reading.

Not much is known at this point about how teachers make decisions about instructional approaches (Kim et al, 2004). Some evidence indicates that past experience plays a big role, with teachers often instructing in the ways they themselves were taught (Kim et al, 2004). The adopted curriculum and textbook also seem to play roles in directing the types of instructional materials and practices used (Kim et al, 2004).

The current study seeks to better understand the current perceptions, levels of use, and factors that may affect the use of graphic organizers by high school teachers. The information gained through this survey of a sample of content area high school teachers may help identify needs in teacher professional development at all levels, pre-service through in-service. In addition, this study could add to the understanding of how teachers make decisions about instructional approaches.

Chapter 3

Methodology

The review of the literature has produced reoccurring themes that emphasize graphic organizers' effectiveness and uses for high school students. This chapter outlines the research methods used in the current study to acquire information regarding teachers' attitudes and uses of graphic organizers in academic high school classrooms. It describes the development of the survey instrument, the steps taken to maximize validity of the instrument, the way data were collected, analyzed, and a description of data analysis procedures.

Purpose of the Study

The purpose of this study was to determine the reported use and perceptions of effectiveness of graphic organizers by high school teachers of English/language arts, social studies, math, and science. Data collection and analysis sought to determine if participating teachers used graphic organizers in their classrooms and how effective teachers perceived graphic organizers to be in the areas of English/language arts, social studies, science, and math.

Research questions:

The research questions include the following, with sub-questions following each:

1. What is the level of use of graphic organizers reported by high school teachers of English/language arts, social studies, math, and science?

    a. What proportion of teachers report using graphic organizers with their classes?

    b. What types of graphic organizers do they report using and to what extent?

c. Is there a difference of reported use among teachers of English/language arts, social studies, math, and science in classroom instruction?

2. What is the perceived value of graphic organizers by those teachers who use them?

a. Do teachers perceive that graphic organizers are particularly effective for certain populations of learners, such as students with learning disabilities, students with intellectual disabilities, students who are gifted, or students who are second language learners?

b. What aspects of graphic organizers do teachers perceive as most valuable to student learning?

c. How valuable do teachers believe each of four types of graphic organizers (concept oriented, web, mind-mapping, others) are in classrooms?

3. What factors may contribute to teachers' reported use of graphic organizers in instruction?

a. Where/how do teachers report learning about graphic organizers?

b. Do teachers believe graphic organizers that are included in textbooks effective in classroom instruction?

c. Is there a difference in the use of graphic organizers based on years of teaching experience?

Research Design

A descriptive research methodology was used for this study which was non-experimental. The researcher used a survey design in order to describe respondents' current perceptions without any experimental intervention. Descriptive data was collected using a web-based questionnaire designed by the researcher and was administered to high

school teachers of English/language arts, science, social studies, and math throughout the United States using the *SurveyMonkey Audience* ™ data base. The researcher did not give treatments nor observe the effects of a potential natural grouping variable such as age. Descriptive and relationship/association questions are used most often in non-experiments and were utilized in the online survey.

Participants

To gather a representative national picture of high school English/language arts, social studies, math and science instruction regarding graphic organizers in classrooms, the researcher received useable survey responses from a total of 175 teachers (45 teachers of English/language arts; 34 teachers of science; 30 teachers of social studies; and 66 teachers of math) across the United States. Survey responses from the high school teachers produced a unique, national data set covering the effectiveness and use of graphic organizers in the classrooms of science, English/language arts, social studies, and math.

Participants were selected by *SurveyMonkey Audience* ™ from a data base of teachers throughout the United States. It was unknown what proportion of this initial sample met the criteria for this study. *SurveyMonkey Audience* ™ was responsible for choosing the participants.

SurveyMonkey Audience ™ and *SurveyMonkey* are web-based survey tools for conducting research, capturing feedback, and evaluating educational offerings. *SurveyMonkey Audience* ™ assisted the researcher in targeting a specific population of respondents and emailed the researcher's survey (Appendix A) to a group of targeted respondents who matched the criteria chosen by the researcher, which was current high

school teachers of English/language arts, science, math, and social studies throughout the United States.

After signing up for participation in researchers' surveys, *SurveyMonkey* members completed a detailed profile survey. As a result, *SurveyMonkey* was able to supply reliable responses to the survey used in this present study based upon their approach to recruitment, incentives, and engagement. Participants were rewarded by *SurveyMonkey* for survey completion with non-cash incentives, such as entry into a weekly sweepstakes opportunity and donations to a chosen charity. These incentives encouraged a respectable response rate without being either coercive or inappropriately generous (Appendix C, Fact Sheet about *SurveyMonkey Audience*). Participants were invited by *SurveyMonkey Audience* ™ from their existing data base of respondents, and invitations to participate with a consent letter were sent to over 1,000 participants. Since the surveys were distributed by *SurveyMonkey Audience*, the researcher had no access to the emails or names of teachers who responded. A second electronic reminder was sent by *SurveyMonkey* to participants approximately three days after the initial request for survey participation.

Instrumentation

In order to determine effectiveness and use of graphic organizers in the classroom, a survey with room for comments was developed by the researcher to be distributed to the respondents. The survey contained Likert-type rating scale, open and closed end, and discrete (yes/no) questions. The survey contained 49 items, directly related to the research questions for purposes of collecting descriptive data and trends among the teacher population that was researched. The survey was delivered online using

Survey Monkey (www.surveymonkey.com) and participants were able to access the survey through *SurveyMonkey*'s dedicated web link. The web link was distributed to teachers in *SurveyMonkey Audience*'s data base by *SurveyMonkey* to maximize the assurance of maintaining confidentiality for respondents.

A survey approach was chosen because of the effectiveness of gathering information from a diverse, nation-wide group of high school teachers of English, social studies, math, and science. The term *survey* is commonly applied to a research methodology, such as the current research, designed to collect data from a specific population, or a sample from that population, and typically utilizes a questionnaire or an interview as the survey instrument (Robson, 1993). Approval of distribution of the survey was sought and given by the Institutional Review Board (IRB) of the University of Nevada, Reno (Appendix D).

The survey items in this study were developed after an analysis of previous studies, discussions with teachers in the field, and a review of the literature regarding graphic organizers. The relationship between research questions, survey inquiries, and the anticipated methods of data analysis is referenced in *Table 1*.

Table 1
Analysis and Display of Data
1. What is the level of use of graphic organizers reported by high school teachers of English/language arts, social studies, math, and science?

Research Question	Survey Items	Analysis/Display
1a. What proportion of teachers report using graphic organizers with their classes?	7, 8, 9	Frequency/percentage distributions
1b. What types of graphic organizers do they report using and to what extent?	12 a-d	Frequency/percentage distributions Mean, median, mode and standard deviation
1c. Is there a difference of reported use among teachers of English/language arts, social studies, math, and science in classroom instruction?	7, 8, 9	ANOVA tests to compare the distributions of users across the four subject areas

2. What is the perceived value of graphic organizers by those teachers who use them?

Research Question	Survey Items	Analysis/Display
2a. Do teachers perceive that graphic organizers are particularly effective for certain populations of learners, such as students with learning disabilities, students with intellectual disabilities, students who are gifted, or students who are second language learners?	14 a-e	Frequency/percentage distributions Mean, median, mode and standard deviation
2b. What aspects of graphic organizers do teachers perceive as most valuable to student learning?	11 a-k	Frequency/percentage distributions Mean, median, mode and standard deviation
2c. How valuable do teachers believe each of four types of graphic organizers (concept oriented, web, mind-mapping, others) are in classrooms?	13 a-j	Frequency/percentage distributions Mean, median, mode and standard deviation

3. What factors may contribute to teachers' reported use of graphic organizers in instruction?

Research Question	Survey Items	Analysis/Display
3a. Where/how do teachers report learning about graphic organizers?	10 a-e	Frequency/percentage distributions Mean, median, mode and standard deviation
3b. Do teachers believe graphic organizers that are included in textbooks effective in classroom instruction?	12 d	Frequency/percentage distributions Mean, median, mode and standard deviation
3c. Is there a difference in the use of graphic organizers based on years of teaching experience?	5 & 9	Independent samples t-test

Pilot Study

The survey instrument was piloted by 15 high school teachers who were not part of the study pool. The pilot teachers represented a variety of subjects, years in service, and school districts. Surveys were emailed to 15 teachers with specific instructions to (1) complete the survey; (2) highlight any survey questions, that were unclear or difficult to understand; (3) highlight specific terminology in yellow that was unclear or difficult to understand; and (4) explain why the term or question was difficult to understand. Ten surveys were returned to the researcher with highlighted questions or terminology. Survey items, or questions, and terminology were adjusted for better respondent understanding.

Methods of Analysis

The data analysis consisted of examining the surveys for correctness and completeness, coding and keying data into a database in SPSS Statistics, and performing an analysis of descriptive responses (Section One: items 1-7; and Section Two: items 8-12 , and Section Three: items 13-15) according to frequency distributions and descriptive

statistics. Frequency tables and descriptive statistics were constructed to display results with respect to each of the three research questions.

Data was categorized into units of information based on variables, such as teacher experience, geographical location, and subject area taught. Once the data was coded, tables were constructed to summarize the data and checked for patterns. A summary view of the data was provided by *SurveyMonkey* to the researcher who was able to create and export charts. The ability to compare and show rules as well as analyze specific data views and segments was available. After viewing the overall Question Summaries from *SurveyMonkey*, the researcher created rules to answer more specific questions so the results could be analyzed in a meaningful way (Further information regarding *SurveyMonkey* procedures in the data acquisition phase can be accessed in Appendix C).

Summary

This study reported on a survey of high school teachers of English/language arts, social studies, science, and math nationwide that asked them to report their use and perceptions of graphic organizers. Descriptive statistics were used to report the survey results and the relationships were investigated among reported use of graphic organizers and subject, teacher preparation, teacher experience, student response, and demographic data.

Chapter 4

Data Analysis and Findings

In this chapter, the results of the data analysis are presented. The data were collected and processed in response to the research questions posed in Chapters 1 and 3. Three fundamental goals drove the collection of the data and the subsequent data analyses. Those goals were (1) to gain insight into high school teachers' reported use of graphic organizers in their classrooms, (2) to determine if the participating teachers felt the graphic organizers were effective in their subject areas, and (3) to investigate factors that might influence teachers' use of graphic organizers.

This chapter first describes the data cleaning procedures conducted to ensure validity of cases. The demographic characteristics of the sample are then described. This is followed by a presentation of the data and findings pertaining to each research question and sub-question. The methodology used to analyze and present the responses to the survey according to each research question has previously been described in Chapter 3, Table 1. All analyses were conducted using SPSS v.20.

Data Cleaning and Response Rate

There were 1,721 surveys sent out via email to members of *SurveyMonkey Audience* ™. Using an initial screening question, respondents were asked to participate only if they taught high school and if they instructed any form of math, science, social studies, or English/language arts. This screening question yielded 226 cases for the study. Following some demographic items, participants were asked two key questions to determine their suitability for this study ("Are you familiar with graphic organizers?" And "Do you use graphic organizers in your teaching?"). Thus, only participants who

provided a response to both of these items were included in the sample. There were 175 cases that met this criterion.

Finally, this study sampling frame was restricted to current high school teachers of English/language arts, social studies, math, and science. Despite the initial screening question, a number of participants did not meet these criteria. Therefore, participants' responses to demographic items were reviewed and participants were excluded if they did not meet criteria based on grades taught (i.e., teachers of elementary, college, or middle-school) or subject area (i.e., teachers of subjects other than English/language arts, social studies, math, and science). Note that participants who taught a range of grades or subjects remained in the sample as long as the grades and subjects included the necessary criteria (i.e., one or more grades 9 through 12, and one or more of the four subject areas). This last data cleaning step yielded a final sample of 120 cases for this study. Therefore, considering the total population of the initial mailing, the response rate of valid cases was 6.97%. However, the response rate may be misleading in that it is not known how many of the original 1,721 surveys went to high school teachers. Teachers who did not meet the criteria (high school and specific content areas) may have self-selected not to respond.

Description of the Sample

Full Sample

The demographic characteristics of the sample are provided in *Table 2*. The distribution of males and females was relatively even with 46.7% males and 51.7% females (1.7% did not provide their gender). The age of participants ranged from 18 to over 60, with the modal age category between 45 and 60 years (35.8%). The modal household income was $50,000 - $99,999 (35.0%). The majority of participants reported

having a graduate degree (68.3%). *Figure 1* shows the location of participants by census region. The East North Central, South Atlantic, and Pacific regions were most represented, with 17.5% of participants located in each of these regions. The average years of total teaching experience was 17.18 (SD = 11.26) with a range from 0 to 46 years.

Table 2

Demographic characteristics of full sample (N = 120)

Variable	Value	N	%
Gender	Male	56	46.7
	Female	62	51.7
	(Missing)	2	1.7
Age	18-29	15	12.5
	30-44	31	25.8
	45-60	43	35.8
	Over 60	29	24.2
	(Missing)	2	1.7
Household Income	$0-24,999	7	5.8
	$25,000-$49,999	19	15.9
	$50,000-$99,999	42	35.0
	$100,000-$149,999	34	28.3
	$150,000+	13	10.8
	(Missing)	5	4.2
Education	Some college	3	2.5
	Associate or Bachelor degree	33	27.5
	Graduate degree	82	68.3
	(Missing)	2	1.7

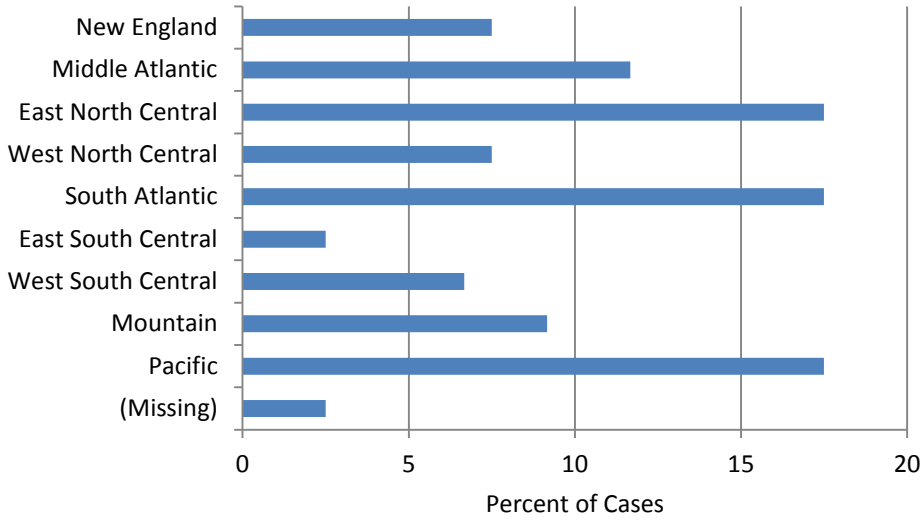

Figure 3. Census region of full sample (N = 120)

Participants were asked to indicate what subject areas they taught. The responses were reviewed and manually coded into one of the four primary subject areas used in this study. The distribution of subject areas taught is provided in *Table 3*, along with sample responses that were coded in each of the categories. The modal response was teachers of English/language arts, comprising 26.7% of the sample. There were 19.2% who taught social sciences, 17.5% who taught math, and 15.8% who taught science. The final 20.8% of participants reported teaching in multiple subject areas relevant to this study (e.g., English and Math).

Table 3

Subject areas of full sample (N = 120)

Subject	Sample responses	N	%
English/language arts	Speech, reading, writing	32	26.7
Social Sciences	History, government, ethics, economics, religion, geography, psychology	23	19.2
Math	Algebra, geometry	21	17.5
Science	Chemistry, biology	19	15.8
Multiple subjects		25	20.8

Subsample of Graphic Organizers Users

Because the majority of the analyses of the research questions were limited to the subsample of participants that were graphic organizer users, descriptive statistics were tabulated to characterize the demographics of this subsample. These are provided in *Table 4*, and the census region is provided graphically in *Figure 2*. The subsample was similar to the full sample in terms of demographics. Regarding location, the modal response was the South Atlantic region (22.4%). The average number of total years of teaching experience was 17.91 (SD = 11.03), with a range from 2 to 46 years.

Table 4

Demographic characteristics of users of graphic organizers (N = 87)

Variable	Value	N	%
Gender	Male	40	46.0
	Female	45	51.7
	(Missing)	2	2.3
Age	18-29	10	11.5
	30-44	24	27.6
	45-60	35	40.2
	Over 60	16	18.4
	(Missing)	2	2.3
Household Income	$0-24,999	4	4.6
	$25,000-$49,999	12	13.8
	$50,000-$99,999	36	41.4
	$100,000-$149,999	25	28.7
	$150,000+	6	6.9
	(Missing)	4	4.6
Education	Some college	2	2.3
	Associate or Bachelor degree	22	25.3
	Graduate degree	61	70.1
	(Missing)	2	2.3

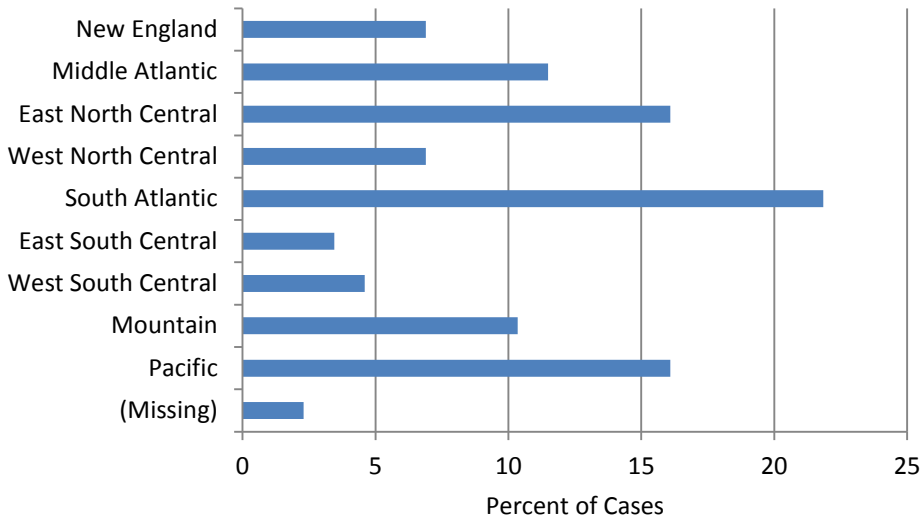

Figure 4. Census regions of graphic organizer users

Table 5 presents the subject areas for the subsample of graphic organizer users. Of the 87 participants in this subsample, 26.4% were teachers of English/language arts, 20.7% taught social sciences, 16.1% taught math, and 14.9% were science teachers. There were 21.8% that taught multiple relevant subjects.

Table 5

Subject areas of graphic organizer users (n = 87)

Subject	Sample responses	N	%
English/language arts	Speech, reading, writing	23	26.4
Social Sciences	History, government, ethics, economics, religion, geography, psychology	18	20.7
Math	Algebra, geometry	14	16.1
Science	Chemistry, biology	13	14.9
Multiple subjects		19	21.8

Research Question 1: What is the level of use of graphic organizers reported by high school teachers of English/language arts, social studies, math, and science?

RQ1a. What proportion of teachers report using graphic organizers with their classes?

Table 6 reports the proportion of respondents who reported familiarity with graphic organizers by subject area and overall. Most of the sample (89.2%) reported being familiar with graphic organizers. The percentage of teachers stating familiarity with graphic organizers by subject area ranged from 84.0% for those teachers who taught multiple content areas to 91.3% for the teachers of the social sciences.

Table 6

Familiarity with graphic organizers by subject area and overall

		Are you familiar with graphic organizers?			
		Yes		No	
	N	n	%	n	%
English/language arts	32	29	90.6	3	9.4
Social sciences	23	21	91.3	2	8.7
Math	21	19	90.5	2	9.5
Science	19	17	89.5	2	10.5
Multiple subjects	25	21	84.0	4	16.0
Overall	120	107	89.2	13	10.8

Table 7 reports whether graphic organizers were used by the teachers. Approximately three quarters of the sample (73.3%) reported using graphic organizers in their teaching. Math teachers had the lowest percentage (66.7%) while social science teachers (82.6%) had the highest percentage of teachers reporting to use graphic organizers in their classes.

Table 7

Use of graphic organizers by subject area and overall

		Do you use graphic organizers in your teaching?			
		Yes		No	
	N	n	%	n	%
English/language arts	32	23	71.9	9	28.1
Social sciences	23	19	82.6	4	17.4
Math	21	14	66.7	7	33.3
Science	19	13	68.4	6	31.6
Multiple subjects	25	19	76.0	6	24.0
Overall	120	88	73.3	32	26.7

RQ1b. What types of graphic organizers do they report using and to what extent?

The analyses for RQ1b and the research questions that follow are limited to the subsample of 87 cases that reported using graphic organizers.

The participants reported their opinions on the effectiveness of graphic organizers by how they were sourced and created, and the responses are shown in *Table 8*. The

mode and mean (lowest mean = highest agreement) showed most agreement for graphic organizers that were “a mixture of teacher- and student-generated.” Thus, teachers felt that graphic organizers created by teacher and student were the most effective. The lowest mean and median was for graphic organizers included in text, indicating that the sample felt that these were the least effective tools in the classroom of the four possibilities.

Table 8

Beliefs on effectiveness of graphic organizers by how they are sourced

		I believe (….) graphic organizers are effective tools in the classroom.							
	N	Very Strongly Agree (1)	Strongly Agree (2)	Agree (3)	Disagree (4)	Strongly Disagree (5)	Very Strongly Disagree (6)	M (SD)	Md
(a) teacher-generated	87	29.9%	33.3%	**34.5%**	2.3%	0.0%	0.0%	2.09 (0.86)	2
(b) student-generated	87	20.7%	35.6%	**39.1%**	4.6%	0.0%	0.0%	2.28 (0.84)	2
(c) a mixture of teacher and student-generated	87	32.2%	**34.5%**	31.0%	2.3%	0.0%	0.0%	2.03 (0.86)	2
(d) included in text	87	14.9%	18.4%	**47.1%**	14.9%	4.6%	0.0%	2.76 (1.03)	3

Note. Mode is in bold font. Md = median.

RQ1c. Is there a difference of reported use among teachers of English/language arts, social studies, math, and science in classroom instruction?

The proportions of teachers familiar with, and users of, graphic organizers by subject areas have previously been reported in *Tables 6 and 7*, respectively. T-tests and descriptive statistics were used to determine whether there were any differences in the proportion of teachers familiar with, or users of, graphic organizers by subject area.

As shown in *Table 9* below, there was no difference in the proportion of teachers familiar with graphic organizers according to their subject area, FET = 1.05, p = .94. Similarly, the proportion of teachers that reported using graphic organizers in classroom instruction did not differ by subject area, FET = 1.95, p = .76. Therefore, there was no evidence of a difference in reported use of graphic organizers among teachers of the four subject areas in this study.

Table 9. Teacher familiarity of graphic according to subject area.

	Are you familiar with graphic organizers in your teaching?			
	English	**Social Studies**	**Science**	**Math**
Familiar	32 (90.6%)	32 (91.3%)	19 (89.5%)	21 (90.5%)
Not familiar	3 (9.4%)	2 (8.7%	2 (10.5%)	2 (9.5%)

Table 10. Use of teachers familiar with graphic organizers by discipline

	Do you use graphic organizers in your teaching?			
	English	**Social Studies**	**Science**	**Math**
Use	32 (61.9%)	23 (82.6%)	19 (68.4%)	21 (66.7%)
Do not use	9 (28.1%)	4 (17.4%)	6 (31.6%)	7 (33.3%)

According to *Tables 9 and 10,* teachers of English use and are more familiar with graphic organizers than science and math teachers.

Research Question 2. What is the perceived value of graphic organizers by those teachers who use them?

RQ2a. Do teachers perceive that graphic organizers are particularly effective for certain populations of learners, such as students with learning disabilities, students with intellectual disabilities, students who are gifted, or students who are second language learners?

Table 9 reports the beliefs of respondents with regard to the effectiveness of graphic organizers for different types of learners. Note that this question was a forced-ranking question, allowing participants to select any column choice (e.g., "strongly agree") only once across the various options.

Based on the patterns of means, medians, and modes, it appeared that the respondents felt that graphic organizers were most effective for struggling learners and learners with learning disabilities. These two choices had the highest means and highest medians (lower numbers = higher agreement). Respondents felt that graphic organizers were less effective for learners with intellectual disabilities or gifted learners, as represented by the lower means, medians, and modes to these items.

Table 9

Effectiveness of graphic organizers for different types of learners

Types of learners	N	Very Strongly Agree (1)	Strongly Agree (2)	Agree (3)	Disagree (4)	Strongly Disagree (5)	Very Strongly Disagree (6)	M (SD)	Md
English language learners	55	21.8%	**25.5%**	**25.5%**	12.7%	10.9%	3.6%	2.76 (1.41)	3
Struggling learners	52	25.0%	**34.6%**	23.1%	9.6%	1.9%	5.8%	2.46 (1.34)	2
Learners with learning disabilities	57	21.1%	31.6%	**36.8%**	5.3%	3.5%	1.8%	2.44 (1.10)	2
Learners with mild to moderate intellectual disabilities	52	9.6%	17.3%	25.0%	**32.7%**	15.4%	0.0%	3.27 (1.21)	3
Learners who are gifted	59	22.0%	13.6%	16.9%	15.3%	**23.7%**	8.5%	3.31 (1.68)	3

Note. Forced-ranking in effect (only one column choice per row). Mode is in bold font. Md = median.

RQ2b. What aspects of graphic organizers do teachers perceive as most valuable to student learning?

The participants were asked to rate a number of aspects of graphic organizers and their responses are shown in *Table 11*. The following aspects of graphic organizers appeared to be most valuable based on analysis of the distributions, modes, means, and means:

- enhance learning and understanding of subject matter content,
- facilitate students' learning by helping them identify areas of focus within a broad topic
- help students structure writing projects
- allow students to classify ideas and communicate those ideas in an organized way
- assist students when they organize their thoughts

Although there were no areas in which the graphic organizers were stated as not valuable (i.e., as would be reflected by disagreement), the two facets that respondents seemed to think were least valuable were: (1) may indicate a student's level of knowledge about a topic or section of text; and (2) enhance critical thinking and memorizing skills.

RQ2c. How valuable do teachers believe each of four types of graphic organizers (concept oriented, web, mind-mapping, others) are in classrooms?

Table 12 indicates the participants' beliefs on the effectiveness of various types of graphic organizers. "Concept-oriented" tools had the highest mode of 2 (the remainder had modes of 3). The mean for concept-oriented organizers was also highest (as indicated by the lowest value, since 1 = most agreement and 6 = most disagreement). The other types of graphic organizers all had modes of 3 ("Agree"), and means/medians that ranged between 2 ("Strongly agree") and 3 ("Agree"). Of these, the higher means/medians were obtained for descriptive or thematic maps, problem and solution maps, and brainstorming.

Thus, it appears that participants thought that concept-oriented organizers were the most effective, following by descriptive/thematic maps, problem and solution maps, and brainstorming.

Table 12 Beliefs on valuable aspects of graphic organizers

I believe graphic organizers….	N	Very Strongly Agree (1)	Strongly Agree (2)	Agree (3)	Disagree (4)	Strongly Disagree (5)	Very Strongly Disagree (6)	M (SD)	Md
• enhance learning and understanding of subject matter content.	86	**36.0%**	31.4%	32.6%	0.0%	0.0%	0.0%	1.97 (.83)	2
• facilitate students' learning by helping them identify areas of focus within a broad topic.	87	**36.8%**	35.6%	27.6%	0.0%	0.0%	0.0%	1.91 (.80)	2
• may indicate a student's level of knowledge about a topic or section of text.	87	20.7%	24.1%	**40.2%**	11.5%	2.3%	1.1%	2.54 (1.09)	3
• act as effective instructional tools.	87	29.9%	**39.1%**	27.6%	3.4%	0.0%	0.0%	2.05 (.85)	2
• help students structure writing projects.	84	**36.9%**	31.0%	28.6%	3.6%	0.0%	0.0%	1.99 (.90)	2
• allow students to classify ideas and communicate those ideas in an organized way.	87	34.5%	**39.1%**	24.1%	2.3%	0.0%	0.0%	1.94 (.83)	2
• help students increase reading comprehension and understanding.	87	28.7%	31.0%	**33.3%**	6.9%	0.0%	0.0%	2.18 (.93)	2
• assist with brainstorming and organizing large amounts of subject material.	87	33.3%	32.2%	**34.5%**	0.0%	0.0%	0.0%	2.01 (.83)	2
• enhance critical thinking and memorizing skills.	86	26.7%	27.9%	**33.7%**	10.5%	1.2%	0.0%	2.31 (1.02)	2
• can be used throughout learning tasks and assist in producing completion for students.	87	27.9%	**33.7%**	32.6%	5.8%	0.0%	0.0%	2.16 (.91)	2
• assist students when they organize their thoughts.	87	**39.1%**	31.0%	28.7%	1.1%	0.0%	0.0%	1.92 (.85)	2

Table 13
Effectiveness of different types of graphic organizers

	N	Very Strongly Agree (1)	Strongly Agree (2)	Agree (3)	Disagree (4)	Strongly Disagree (5)	Very Strongly Disagree (6)	M (SD)	Md
Descriptive or thematic map	87	17.2%	35.6%	**42.5%**	3.4%	1.1%	0.0%	2.36 (.85)	2
Network tree	84	10.7%	29.8%	**46.4%**	13.1%	0.0%	0.0%	2.62 (.85)	3
Spider web map	84	11.9%	28.6%	**47.6%**	10.7%	1.2%	0.0%	2.61 (.88)	3
Problem and solution map	84	16.7%	34.5%	**42.9%**	6.0%	0.0%	0.0%	2.38 (.83)	2
Mind map	84	15.5%	25.0%	**47.6%**	11.9%	0.0%	0.0%	2.56 (.90)	3
Fishbone map	78	6.4%	17.9%	**51.3%**	24.4%	0.0%	0.0%	2.94 (.83)	3
Brainstorming	85	23.5%	29.4%	**41.2%**	5.9%	0.0%	0.0%	2.29 (.90)	2
Concept oriented	85	20.0%	**43.5%**	31.8%	4.7%	0.0%	0.0%	2.21 (.82)	2
Mind mapping	81	22.2%	24.7%	**42.0%**	11.1%	0.0%	0.0%	2.42 (.96)	3

Note. Mode is in bold font. Md = median.

Research Question 3. What factors may contribute to teachers' reported use of graphic organizers in instruction?

RQ3a. Where/how do teachers report learning about graphic organizers?

Table 14 reports where participants learned about graphic organizers. It can be observed that the highest mean and median were for "in teacher workshops or in-service trainings." The next most frequent response was in teacher preparation programs. Thus, teachers learned about graphic organizers in courses, workshops, and trainings seminars, or (secondly) in teacher preparation, more so than in textbooks, teacher modeling, or professional reading.

Table 14
Where participants learned about graphic organizers

I learned about graphic organizers…	N	Very Strongly Agree (1)	Strongly Agree (2)	Agree (3)	Disagree (4)	Strongly Disagree (5)	Very Strongly Disagree (6)	M (SD)	Md
1. in college/teacher education courses	50	**34.0%**	12.0%	18.0%	20.0%	4.0%	12.0%	2.84 (1.72)	3
2. in teacher workshops or in-service trainings	52	28.8%	**40.4%**	23.1%	5.8%	0.0%	1.9%	2.13 (1.03)	2
3. through textbooks in my subject area	50	8.0%	18.0%	**24.0%**	22.0%	18.0%	10.0%	3.54 (1.45)	3.5
4. through another teacher modelling the technique for me	60	8.3%	20.0%	**28.3%**	26.7%	8.3%	8.3%	3.32 (1.35)	3
5. through personal professional reading	73	20.5%	19.2%	**21.9%**	16.4%	12.3%	9.6%	3.10 (1.6)	3

Note. Forced-ranking in effect. Mode is in bold font. Md = median.

RQ3b. Do teachers believe graphic organizers that are included in textbooks effective in classroom instruction?

The responses to teachers regarding the effectiveness of graphic organizers according to where they were obtained from have previously been reported (RQ1b). The table is repeated here for ease of exposition (*Table 15*). Of the four options, graphic organizers that are included in textbooks received the lowest mean and median ranking of the four options. As such, it would appear the teachers generally believed that graphic organizers included in textbooks were the least effective of the four options available.

Table 15

Beliefs on effectiveness of graphic organizers by how they are sourced

		I believe (….) graphic organizers are effective tools in the classroom.							
	N	Very Strongly Agree (1)	Strongly Agree (2)	Agree (3)	Disagree (4)	Strongly Disagree (5)	Very Strongly Disagree (6)	M (SD)	Md
(a) teacher-generated	87	29.9%	33.3%	**34.5%**	2.3%	0.0%	0.0%	2.09 (0.86)	2
(b) student-generated	87	20.7%	35.6%	**39.1%**	4.6%	0.0%	0.0%	2.28 (0.84)	2
(c) a mixture of teacher and student-generated	87	32.2%	**34.5%**	31.0%	2.3%	0.0%	0.0%	2.03 (0.86)	2
(d) included in text	87	14.9%	18.4%	**47.1%**	14.9%	4.6%	0.0%	2.76 (1.03)	3

Note. Mode is in bold font. Md = median.

RQ3c. Is there a difference in the use of graphic organizers based on years of teaching experience?

Among those that use graphic organizers, the average years of teaching was 17.91 (SD = 11.03). Among non-users, the average total years of teaching was 15.26 (SD = 11.79). An independent samples t-test was used to compare whether the teaching experience differed among users and non-users of graphic organizers. The results of the test indicated no significant difference in the mean values, *df* (116), t(118) = 1.15, p = .25. Therefore, there was no evidence of a relationship between teaching experience and reported use of graphic organizers.

This study investigated teachers' perceptions and use of graphic organizers in high school academic classrooms. The results suggest that teachers do use and are familiar with graphic organizers in high school academic classroom, at least under the conditions of the present study. However, a much higher proportion of English teachers (versus social studies, math, and science) perceived that their respective graphic

organizers were effective instructional tools. Opportunities for future research exist to perhaps reinforce or refute these findings, while simultaneously enhancing the instructional research literature.

The next chapter discusses these results and their implications, and provides suggestions for educational practice and policy, as well as future research.

Chapter 5

Discussion, Conclusions, and Recommendations for Future Research

The researcher investigated teachers' perceptions of graphic organizer use across the United States. Two types of findings are discussed: those that contribute to answering the research questions, and those that are beyond the scope of the questions. A discussion of limitations follows. Finally, implications for both educational practice and future research are suggested.

This study's primary goal was to discover teacher's perceptions of effectiveness of graphic organizers in content area high school classroom to assist students' learning. Research states that graphic organizers can act as instructional tools in addition to helping students organize their thinking, organize their thinking, comprehend material, expand vocabulary, and write effectively (Arthaud & Goracke, 2006)

Teachers can use graphic organizers to assess a student's knowledge about a topic or section of text showing areas for improvement as well as judge if they need to reteach

concepts. Informational structures, according to Novak and Gowin (1984), help to simplify complexity with content areas contained in lectures and textbooks, indicate interrelationships, and illustrate webs of relevant concepts (Gajria, Jitendra, Sood, & Sacks, 2007).

Discussion of Findings

The current study sought to better understand the perceptions, levels of use, and factors that may affect the implementation of graphic organizers by high school teachers in major content areas. The information gained through this survey of a sample of content area high school teachers may help identify needs in teacher professional development at all levels. In addition, this study could add to the understanding of how teachers make decisions about instructional approaches.

A key finding of the current study was that, overall, the high school teachers of English/language arts, social studies, science and math who responded to the survey were familiar with and had positive perceptions of graphic organizers. Over 70 percent of them reported using graphic organizers in their instruction. No significant differences in the familiarity with graphic organizers were found among teachers in the four major content areas. In addition, no significant differences were found among teachers with differing levels of teaching experience. It seems clear that, within the population responding to the survey, graphic organizers have been adopted as a part of the instructional strategies used with high school students in their content area courses.

The survey participants indicated that they perceived the following aspects of graphic organizers to be most valuable. According to the teachers, graphic organizers (1) enhance learning and understanding of subject matter content, (2) facilitate students'

learning by helping them identify areas of focus within a broad topic, (3) help students structure writing projects, (4) allow students to classify ideas and communicate those ideas in an organized way, and (5) assist students when they organize their thoughts. The two facets that respondents seemed to think were least valuable were: (1) indicating a student's level of knowledge about a topic or section of text, and (2) enhancing critical thinking and memorizing skills. These findings are consistent with the research literature that indicates graphic organizers facilitate higher-order thinking and metacognition (e.g., Hall & Strangman, 2002; Riener and Willingham, 2010).

Participants in the current study rated the effectiveness of various types of graphic organizers. They responded that concept-oriented organizers were the most effective, following by descriptive/thematic maps, problem and solution maps, and brainstorming. This finding supports those of Alvermann and Boothby (1986).

Another interesting finding of the current study was that the respondents felt that graphic organizers were most effective for struggling learners, English learners, and those with learning disabilities. Respondents felt that graphic organizers were less effective for learners with intellectual disabilities or gifted learners. Further research is needed to determine the reasons for these findings and to determine if these teacher perceptions have empirical support.

An additional important finding was how and when the responding teachers learned about graphic organizers. Over 90 percent of the respondents indicated they learned about Graphic Organizers in workshops or in-service settings, while only eight percent reported NOT learning about graphic organizers through this type of professional development, indicating a widespread investment of school and district resources.

Approximately 64 percent indicated that they learned about graphic organizers in their teacher preparation programs, but 36 percent report NOT learning about them in pre-service training. Overall, inservice and professional workshops and teacher preparation programs surpassed textbooks, teacher modeling, or professional reading as sources of information about graphic organizers with this group of teachers.

The survey did not ask where they *first* learned about graphic organizers or which sources of information about graphic organizers were most relevant or useful. These would be excellent topics for further exploration and could provide rich insights into the best way to support teachers in their use of graphic organizers.

Although the teachers who took the survey supported the effectiveness of all graphic organizers, they rated those provided in textbooks as somewhat less effective than those that were teacher-generated, student-generated, or a combination of teacher and student generated. The combination of teacher and student generated graphic organizers were rated most highly.

From the results of the survey, it is possible to create a profile of a typical teacher who might be an effective user of graphic organizers. This typical user might be a female teacher of social studies with a graduate degree who teaches five sections of sophomore world history. She is between 45 and 60 years of age and lives in the South Atlantic region of the country. She learned about graphic organizers through in-service or professional development experiences, although she was likely introduced to their use in her preservice preparation. She prefers to use graphic organizers that are concept oriented and a mixture of teacher and student generated. This teacher feels these graphic organizers are particularly effective with struggling students or those with learning

disabilities, but are not effective with students with intellectual disabilities. In her opinion, graphic organizers provide many benefits, most importantly helping the students structure their writing, helping them focus on the main ideas within a broad topic, and enhancing overall their understanding of the subject matter.

Findings Compared with Research Literature

In order to facilitate learning for students, teachers must continually develop, adapt, and refine their instructional approaches, using those practices established by research as being effective. This includes developing learning strategies that connect new knowledge with prior knowledge that will facilitate change in the learning process within individual learning styles and environments. This would involve a flexible approach in teaching strategies that relies less on rote teaching and incorporates critical thinking skills through the use of graphic organizers as pedagogical tools.

The perceptions of teachers surveyed paralleled the research literature in many areas, but also pointed to topics that could lead to a greater understanding of the overall use of graphic organizers.

The results of the study indicate that teachers felt that graphic organizers created by teacher and student were the most effective. This is consistent with the findings of Alvermann and Bothby (1986) that graphic organizers constructed by students in collaboration with teachers led to greater learning. This suggests for teacher-and student-generated graphic organizers to be effective, they must be connected with students' backgrounds through engagement and collaboration (Castagno & Brayboy, 2008). Greene (2007) supports that collaboration between teacher and student along with relevance of topics could affect learners' motivation and engagement. He explains that

topics become interesting to learners when they can relate to actual background experiences.

The research literature and the teachers participating in this study also agreed in the specific benefits of graphic organizers. Responding teachers, especially in social studies, indicated that graphic organizer assisted students in focus, structure, organization, and more effective communication about subject matter. Fealy's (2010) case study research found many of the same benefits. Romance and Vitale (2006) and Plotnik (2001) support this in that graphic organizers as pedagogical tools may increase student learning by organizing complex concepts while expressing the importance of that concept.

An area in which teachers of this study differed from the research literature was their lower rating of graphic organizers as a method for enhancing critical thinking and rote memorization. According to Huang (2002), graphic organizers could help students in skills of critical thinking by allowing them to actively participate in their own learning.

The teachers surveyed indicated that graphic organizers were most effective with students with learning disabilities. The majority of the research to date has been conducted with this population of students. A meta-analysis by Dexter and Hughes (2011) found increased vocabulary, comprehension and inferential knowledge in students with learning disabilities when taught using graphic organizers. Teachers surveyed indicated that graphic organizers would be least effective with students who were gifted or with intellectual disabilities. No research studies were found that either supported or refuted this opinion. It is unclear whether the lack research may have influence the

teachers' responses or if they were based on factors such as their own experience or the small number of students who are gifted or cognitively impaired in typical classrooms.

Policy and Practice Implications

Research has indicated that graphic organizers are effective instructional strategies. Students are able to identify and organize significant information, assist in giving clarity to difficult texts and content, and concepts relationships become easier to understand. Charts, timelines, Venn diagrams, cause and effect sequences—these are just a few of these visual tools that can support student learning (Arthaud & Goracke, 2006).

The current study supports that a majority of high school teachers who participated in this study were familiar with graphic organizers, had largely positive perceptions of them, and specific ideas about their use. However, it is still unknown how frequently teachers use graphic organizers or how effectively. In order for this valuable instructional tool to have more impact, it needs to be incorporated into daily instruction in all content areas. The state of North Carolina has taken such a step in making graphic organizers a part of their common core or "essential standards" in all subjects (North Carolina Department of Public Instruction, 2012).

Graphic organizers may be utilized as a teaching strategy to connect the disciplines across the curriculum. For example, science and math teachers could work together to provide mathematical strategies through graphic organizers to assess student skills in reasoning and problem solving. Teaching strategies utilizing effective graphic organizers could also include vocabulary, reading and writing across the curriculum in English/language arts, math, science, and social studies. Changes in teacher educational

curriculum concerning motivation, cognitive engagement, and different learning styles could help to accomplish this goal.

Based on the responses of this population, graphic organizers provided in textbooks are not seen as effective or useful as graphic organizers from other sources. Graphic organizers were found to be consistently presented in text materials used throughout the world in a study by Djajalaksana (2011). Based on the current study, it could behoove textbook and curriculum producers to look at the best way to present graphic organizers and accompanying teacher support materials to make them more accessible to teachers.

Study Limitations

This descriptive quantitative study used a survey instrument to examine the relationships among variables (teaching experience, content areas taught, teacher opinions, and attitudes toward use of graphic organizers) to answer questions concerning a sample of high school teachers throughout the United States who teach in the areas of English/language arts, social studies, math, and/or science.

One limitation of a descriptive quantitative study when using survey instruments can be the possibility of differences in interpretation of the survey response items. Participants may interpret similar items differently due to differences in their perspectives or experiences. Pilot testing can provide validity of the content of the survey instrument by allowing the researcher to improve the test questions (Creswell, 2009). Pilot testing of the survey with 15 high school teachers who were not part of the study pool with

subsequent feedback on any problems was conducted to add validity to the survey instrument.

The term, *graphic organizer*, can be general and advocates tend to refer to very different visual formats when they recommend the use of graphic organizers. The broadness of the term, *graphic organizer*, could lead to some confounding or the results of this study although specific examples were provided for clarity.

An additional limitation is related to the survey population. *SurveyMonkey Audience* ™ assisted the researcher in targeting a population of respondents and emailed the researcher's survey to 1,721 educators, which included elementary, middle, and high school teachers. Screening questions enabled the researcher to narrow usable surveys to a group of targeted respondents who matched the criteria for the study, which was current high school teachers of English/language arts, science, math, and social studies throughout the United States. As a result, however, it is difficult to determine a total response rate, since it is not known how many of the total 1,721 high school teachers were teachers in in content areas. The rate of actual response was 6.975. Those teachers responding may have not been a representative sample of *ALL* high school content teachers. They may have been more experienced with graphic organizers or even more motivated to contribute to the profession by responding to a research survey.

Recommendations for Future Research

This study provided insights into teacher use and perceptions of graphic organizers, but a lot of questions remain.

There are a number of studies on the effectiveness of graphic organizers in textbooks, classroom instruction, and the area of assessment, especially for students in K-

6. Continuing research exploring the utilization of graphic organizers in enhancing classroom learning in a variety of different areas in secondary education is needed. These could include the effectiveness of graphic organizers for gifted learners and students with intellectual disabilities at a variety of ages.

Though there is some research in this area, further research regarding concept-oriented graphic organizers and independent learning for confidence building is warranted for struggling learners and learners with learning disabilities.

The results of the study implicate that teachers learned about graphic organizers in courses, workshops, and trainings seminars, more so than in textbooks, teacher modeling, or professional reading. Further research on how teachers make decisions about instructional approaches regarding graphic organizers could be beneficial. Some evidence indicates that past experience plays a big role, with teachers often instructing in the ways they themselves were taught. The adopted curriculum and textbook also seem to play roles in directing the types of instructional materials and practices used. Further research in this area as to how teachers make decisions regarding the utilization of graphic organizers could be beneficial.

There are some research studies in the literature that pertain to graphic organizers in different disciplines. Information about teachers' approaches to instructional strategies utilizing not only effective but creative graphic organizers in different disciplines is limited. Additional research on creative and effective organizers could provide useful information for teacher preparation and professional development.

In exploring the literature, it was difficult to find research on how graphic

organizers can connect the curriculum across the disciplines. The results of this study indicate the percentage of teachers stating familiarity with graphic organizers by subject area ranged from 84.0% for those teachers who taught multiple content areas to 91.3% for the teachers of the social sciences. The proportion of teachers that reported using graphic organizers in classroom instruction did not differ significantly by subject area.

Further research regarding how graphic organizers can connect overlapping disciplines could give teachers the strategies to provide students with learning perspectives that are interdisciplinary connected, engaging, and motivating. This would show that information across the curriculum is connected with no dividing lines to separate them. Additional research regarding the use of graphic organizer across the disciplines by students that have become experts in their utilization is also needed.

Castagno and Brayboy (2008) state that there is an increase in the number of diverse students in schools and their needs are not being met. In a culturally diverse classroom, the learning needs of the students are equally diverse, and if those needs are not addressed, students may become disengaged and not motivated to learn.

Research regarding the potential of graphic organizers in real world diverse classroom environments may be beneficial for teachers and diverse learners (Alshatti, Watters, & Kidman, 2011).

Research suggests that there are barriers to teachers' use of graphic organizers. Lack of time for preparation, pressure to cover the curriculum, and other factors were reported by Strangman and Boothby (2004) as reasons teachers may not use them in their instruction. Additional district and administrative support are needed if these valuable tools are to be used to their full potential in today's schools.

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APPENDIX A

Data Collection Survey

Welcome to the *Teacher's Graphic Organizer Survey* questionnaire!

Thank you for participating in the survey that will assist other teachers designing instruction. The following questionnaire will take approximately 10 minutes. Please proceed to the next page to begin the first question.

Thank you.

Section One: Participant Profile

1. Gender
   - Male
   - Female

2. Age _____

3. Degree _____

4. Demographic Area of Teaching USA _____

5. Total Years of Teaching Experience _____

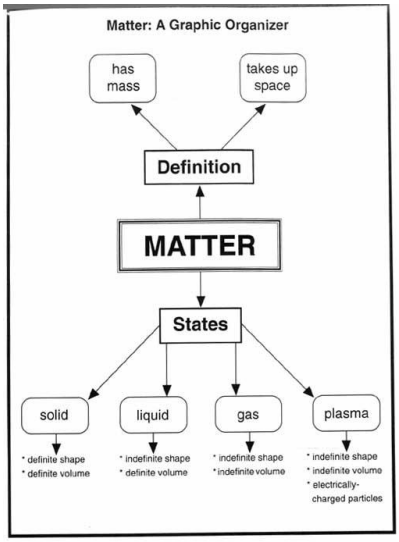
6. Grade(s) of students instructed this school year _____

7. Teacher of _____

Section Two: Frequency and Effectiveness of Graphic Organizers

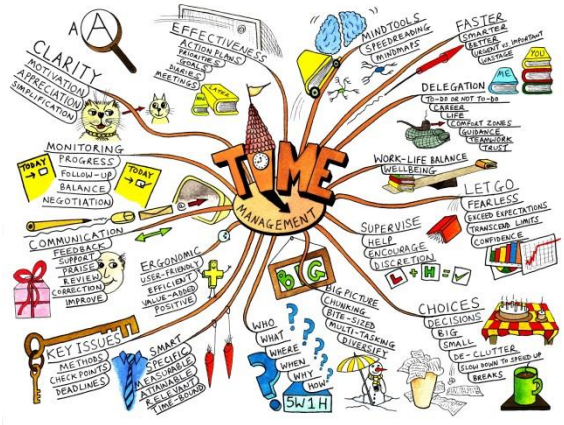
Students and teachers can be assisted organizing their thoughts through the use of a graphic organizer which is a visual learning tool. A graphic organizer visually summarizes a task into manageable steps. Graphic organizers can be subject-specific or more general such as planning or teamwork graphic organizers.

Subject Area: Chemistry



http://www.iteachbio.com/Chemistry/Chemistry/chem.htm

Planning Graphic Organizer



http://www.mindtools.com/media/Diagrams/mindmap.jpg

8. Are you familiar with graphic organizers?
   - Yes
   - No
   - Not sure

9. Do you use graphic organizers in your teaching?
   - Yes
   - No
   - Not sure

10. Please rate how you learned about graphic organizer use in the classroom?

	Very Strongly Agree	**Strongly Agree**	**Agree**	**Disagree**	**Strongly Disagree**	**Very Strongly Disagree**
I learned about graphic organizers in college/teacher education courses.						
I learned about graphic organizers in teacher workshops or in-service trainings.						
I learned about graphic organizers through textbooks in my subject area.						
I learned about graphic organizers through another teacher modeling the technique for me.						
I learned about graphic organizers through personal professional reading.						
Other.						

11. For the subject area(s) you teach, please read the statements regarding graphic organizers and rate your opinions on the scale provided.

	Very Strongly Agree	**Strongly Agree**	**Agree**	**Disagree**	**Strongly Disagree**	**Very Strongly Disagree**
I believe that graphic organizers enhance						

learning and understanding of subject matter content.						
Depending upon the task, I believe graphic organizers facilitate students' learning by helping them identify areas of focus within a broad topic.						
I believe graphic organizers may indicate a student's level of knowledge about a topic or section of text.						
I believe graphic organizers act as effective instructional tools.						
I believe graphic organizers help students structure writing projects.						
I believe graphic organizers allow students to classify ideas and communicate those ideas in an organized way.						
I believe graphic organizers help students increase reading comprehension and understanding.						
I believe graphic organizers assist with brainstorming and organizing large amounts of subject material.						
I believe graphic organizers enhance critical thinking and memorizing skills.						
I believe graphic						

organizers can be used throughout learning tasks and assist in producing completion for students.						
I believe graphic organizers assist students when they organize their thoughts.						

12. For the subject area(s) you teach, please rate your viewpoints about effectiveness of how graphic organizers are created in your subject area.

	Very Strongly Agree	**Strongly Agree**	**Agree**	**Disagree**	**Strongly Disagree**	**Very Strongly Disagree**
I believe teacher generated graphic organizers are an effective tool in instruction.						
I believe student generated graphic organizers are an effective tool in instruction.						
I believe a mixture of teacher and Student generated graphic organizers are effective tools in the classroom.						
I believe that the graphic organizers included in the text for my courses are effective tools in the classroom.						

Section 3- Teacher Opinion

13. Please rate your opinion regarding the effectiveness of the following graphic organizers in your classroom.

	Very Strongly	**Strongly Agree**	**Agree**	**Disagree**	**Strongly Disagree**	**Very Strongly**

	Agree					**Disagree**
A Descriptive or Thematic Map						
Network Tree						
Spider Web Map						
Problem and Solution Map						
Mind Map						
Fishbone Map						
Brainstorming						
Concept Oriented						
Mind Mapping						
Other						

14. Please rate how effective graphic organizers are with the list of learners below.

	Very Strongly Agree	**Strongly Agree**	**Agree**	**Disagree**	**Strongly Disagree**	**Very Strongly Disagree**
Types of Learners						
English language learners						
Struggling learners						
Learners with learning disabilities						
Learners with mild to moderate intellectual disabilities						
Learners who are gifted						
Other: (Please list)						

15. OVERALL

	Very strongly agree	**Strongly agree**	**Agree**	**Disagree**	**Strongly disagree**	**Very strongly disagree**
I believe graphic organizers should be used in the classroom.						
I believe graphic organizers are effective in the high school classroom.						

Please add any comments that might clarify your use of Graphic Organizers or your answers to the questions above:

_____

_____

Please indicate if you are willing to be contacted for a telephone interview as a follow-up to this survey:

- Yes
- No

If yes, please provide your email address for further contact
_____ (This will be kept confidential).

Thank you for your participation.

APPENDIX B
Consent Form

The purpose of this research project is to investigate the use and effectiveness of graphic organizers by high school teachers of English, social studies, math, or science.

This is a research project being conducted by a graduate student at University of Nevada Reno, Reno, NV. You are invited to participate in this research project because you are a current high school teacher of English, social studies, math, or science in the United States and part of SurveyMonkey's Audience Data Base.

Your participation in this research study is voluntary. You may choose not to participate. If you decide to participate in this research survey, you may withdraw at any time. If you decide not to participate in this study or if you withdraw from participating at any time, you will not be penalized.

The procedure involves filling an online survey that will take approximately 30 minutes. Your responses will be confidential and we do not collect identifying information such as your name, email address or IP address. The survey questions will be about your use of graphic organizers in your subject area.

We will do our best to keep your information confidential. All data is stored in a password protected electronic format. To help protect your confidentiality, the surveys will not contain information that will personally identify you. The results of this study will be used for scholarly purposes only and may be shared with University of Nevada, Reno, College of Education representatives.

This research has been reviewed according to University of Nevada, Reno IRB procedures for research involving human subjects.

ELECTRONIC CONSENT: Please select your choice below.

Clicking on the "agree" button below indicates that:

• you have ready the above information

• you voluntarily agree to participate

• you are at least 18 years of age

If you do not wish to participate in the research study, please decline participation by clicking on the "disagree" button.

ELECTRONIC CONSENT: Please select your choice below.

Clicking on the "agree" button below indicates that:

• you have ready the above information

• you voluntarily agree to participate

• you are at least 18 years of age

If you do not wish to participate in the research study, please decline participation by clicking on the "disagree" button. agree

disagree

APPENDIX C

Fact Sheet about *SurveyMonkey*

SurveyMonkey is the world's leading provider of web-based survey solutions, used by companies, organizations, and individuals to gather the insights they need to make more informed decisions.

- Established in 1999, *SurveyMonkey* was one of the first providers of online survey platforms and has over a dozen years of experience in helping customers make decisions with online surveys.
- *SurveyMonkey* customers include businesses, academic institutions, and organizations of all shapes and sizes.

SurveyMonkey has operated its *Audience* product, which provides access to online samples, since 2011.

SurveyMonkey's sample population data base is primarily sourced from a proprietary panel, *SurveyMonkey* Contribute.

- The proprietary online panel is dedicated solely to supporting customers seeking insights. Respondents are recruited to *SurveyMonkey Contribute* through a variety of means; the primary method of recruitment being *SurveyMonkey* survey respondents. Over 30 Million respondents answer *SurveyMonkey* surveys sent out by the subscribers each month.
- Sources may be blended when specific targeting requires capacity that one internal source cannot fulfill. *SurveyMonkey Contribute's* has a respondent recruitment source and charity based incentive model.

The sample sources for *SurveyMonkey's Audience* are recruited and used solely for market research purposes.

- The main recruitment source, the over 30+ million respondents who respond to *SurveyMonkey* customer surveys each month, which are provided an opportunity to register and take more surveys, offer a broad spectrum of new survey respondents across demographic groups.
- In order to obtain a representative sample of the targeted population, *SurveyMonkey Audience* ™ is, overall, a diverse group of people and is reflective of the U.S. population (and of other country populations for International members).
    - When a project is contracted by a researcher, the researcher is asked how many responses are needed, and any specific targeting requirements (e.g. gender, age, income, location, etc.).
    - Researchers can also choose to create their own spread among groups, request send-outs to specific target groups, or request that the sample be sent to a nationally representative group of respondents.

SurveyMonkey also provides a balance on certain demographic attributes based on the U.S. Population Survey depending on sample size and targeting requirements.

Procedure

Survey invitations generally ask respondents to provide their valuable insights to help researchers make better decisions.

- It is also common to display the charity donation that the panelist will contribute for their participation in the survey.

- There are also clear instructions within the invitation to start the survey which links directly to the first page of instructions or questions within the survey.
- The invite also includes a support email address for any questions relating to the survey.

Incentives

In exchange for providing their time and opinions, members of SurveyMonkey Contribute are provided with two non-cash rewards. These unique incentives are offered to limit the problems that can arise from offering cash rewards and encourage respondents to provide honest, thoughtful opinions.

Each survey respondent who finishes a survey receives:

- A $0.50 donation to the charity of their choice (*SurveyMonkey* makes this donation on their behalf, and has a variety of charity partners which members can choose from)
- An entry into an instant win sweepstakes to win $100 (*SurveyMonkey* randomly selects 1 winner per week).

After the survey is launched, participants have access to results and demographic data in real time.

- Researchers can analyze their data at any time during the project, while additional responses will continue to be submitted until they are notified by *SurveyMonkey* systems that the project has closed.

For every *SurveyMonkey Audience* ™ project launched, regardless of the targeting criteria applied to a targeted Audience, demographic information is automatically provided about the respondents' gender, age range, and highest education level attained.

- The researcher can also export data using the *Analyze BETA* feature and have presentation-ready formats with graphics and user-friendly layouts in PDF format.

SurveyMonkey employs several unique approaches in building member groups of people to take surveys to combat many issues with undesired within-survey behavior.

- There are no direct monetary rewards provided for finishing a survey, but instead charitable donations or sweepstakes entries are offered to respondents in exchange for their participation.

The number of invitations each member will receive is limited. On the demand side, *SurveyMonkey* also provide guidelines for researchers when setting up surveys by limiting survey length and the presence of disengaging questions types.

At the time of respondent recruitment, respondents are made aware of the purpose of participating in the survey (i.e. to take part in educational research).

- When invites are sent out to respondents, they are notified of the confidential nature of their responses and given the opportunity to 'opt out' of the survey.

SurveyMonkey's Privacy Policy is located on respondents' invites and is made available on the company website in the Policy Center. The policy is segmented into two sections: one for survey creators and one for survey respondents. It covers what information is collected, how the information collected is used, and with whom the information is disclosed (*see Privacy Policy*).

University of Nevada, Reno

Research Integrity Office
218 Ross Hall / 331, Reno, Nevada 89557
775.327.2368 / 775.327.2369 fax
www.unr.edu/research-integrity

APPENDIX D – IRB Permission Letter

DATE: January 30, 2014

TO: Carolyn Triano; Chris Cheney

PROJECT TITLE: Teacher's Reported Use of and Perceptions about Graphic Organizers in High School Content Area classrooms

REFERENCE #: 2014E054
SUBMISSION TYPE: Exemption
ACTION: DETERMINATION OF EXEMPT STATUS
DECISION DATE: January 30, 2014
EXPIRATION DATE: January 30, 2017
REVIEW CATEGORY: Exemption category # *2*

The UNR Institutional Review Board has determined this project is EXEMPT FROM IRB REVIEW according to federal regulations. Please note, the federal government has identified certain categories of research involving human subjects that qualify for exemption from federal regulations. The IRB is authorized by the federal government to determine whether studies thought by the principal investigator (PI) to be exempt from federal regulations actually qualify for exemption criteria. Only the IRB has authority to make a determination that a study is exempt from federal regulations and from IRB review and approval. The above-referenced protocol was reviewed and the research deemed eligible to proceed in accordance with the requirements of the Code of Federal Regulations on the Protection of Human Subjects (45 CFR 46.101 paragraph [b]).

APPROVED DOCUMENTS:
Application for Exempt Research
Data collection, Teachers Survey
Survey Monkey Survey Fact Sheet
Gold Members Services Statement, Privacy Policy. Security Statement
We will retain a copy of this correspondence within our records.
If you have any questions, please contact the office at 775-327-2367. Please include your project title and reference number in all correspondence with this committee.
Nancy Moody
Nancy Moody, JD MA
Director, Research Integrity Office

Appendix E – Sample Graphic Organizers

T Chart for Antithesis File Extension: pdf

T Chart for Thesis File Extension: pdf

Mapping for Antithesis File Extension: pdf

Mapping for Thesis File Extension: pdf

T Chart for A Goldfish Makes the Best Pet File Extension: pdf

Sample Evaluation Rubric File Extension: pdf