THE EFFECT OF GRAPHIC ORGANIZERS ON THE ACADEMIC ACHIEVEMENT OF HIGH SCHOOL STUDENTS IN UNITED STATES HISTORY WHO RECEIVE INSTRUCTION IN A BLENDED, COMPUTER-BASED LEARNING ENVIRONMENT

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THE EFFECT OF GRAPHIC ORGANIZERS ON THE ACADEMIC ACHIEVEMENT OF HIGH SCHOOL STUDENTS IN UNITED STATES HISTORY WHO RECEIVE INSTUCTION IN A BLENDED, COMPUTER-BASED LEARNING ENVIRONMENT

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ABSTRACT

George K. Conley. THE EFFECT OF GRAPHIC ORGANIZERS ON THE ACADEMIC ACHIEVEMENT OF HIGH SCHOOL STUDENTS IN UNITED STATES HISTORY WHO RECEIVE INSTUCTION IN A BLENDED, COMPUTER-BASED LEARNING ENVIRONMENT. (Under the direction of Dr. Samuel Smith) School of Education, November, 2008.

The purpose of this study was to investigate the effect of graphic organizers on the academic achievement of high school students receiving instruction in United States History via an online blended learning environment. With 60 participants in the study, the students were equally divided into two groups of 30 participants each. Group I was designated as the treatment group, while Group II formed the control group. A two-tailed t-test was used to determine that the means of the two posttests were not significantly different at a probability level of .05. Therefore, the results of this research study indicated that high school students who received instruction in United States History in an online blended learning environment using graphic organizers did not perform significantly higher on the End-of-Course Test than high school students who did not receive instruction using graphic organizers.

DEDICATION

I would like to dedicate this research project to my wife, Vickie, and my daughter Kimberly, who have never failed to provide me support and encouragement. Without Vickie's nudging, I would have never taken that all important first step on this educational journey, and without her continued support and dedication I would have most certainly never completed the passage. It was Kimberly's tenacity and her unwavering spirit, while facing her own academic hurdles, which inspired me to press on even when the trek seemed most difficult. To my parents who inspired me to dream, yet would not live to witness me realize the fruition of my dream, I will ever owe a debt of gratitude.

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CHAPTER I: INTRODUCTION

For as long as there have been educators, there has been an unquenchable thirst for superior instructional techniques. Through the years, technological advancements have brought about alterations in pedagogical techniques used by educators in the delivery of their curriculum. From the practice of combining crushed clay and ashes to form a material useful for painting and writing symbols and letters to the invention of the abacus, educators have, throughout the ages, continued to adapt and incorporate new technologies in their classrooms in an effort to facilitate and enhance the flow of information from the teacher to the student.

There has never existed a period in the history of mankind when there has been such a phenomenal, exponential creation of information and new technologies. Educators in this environment are sometimes frantically attempting to keep in pace with the advancements of technology which have relevance in the world of education. While some educators still grapple with creating presentations in PowerPoint, others are busy learning new software programs and still others are actively engaged in writing educational software. First utilized at the collegiate level and pioneered by universities such as Liberty University, online education has become a popular avenue in obtaining post-secondary education by many students throughout the world. The use of online computer-based educational programs has evolved and is now available at the secondary level in many schools in America and around the world.

As in the past, some public as well as private school educators are now being challenged to adapt their educational instructional strategies to accommodate students

receiving their education entirely through an on-line venue or by way of some sort of blended venue. A smattering of pedagogical techniques, which educators have used successfully in the past, suddenly were found to be obsolete in this technological educational environment, while others remain a staple which educators continue to utilize to facilitate attainment of knowledge among their students. One such technique that has been identified as a bulwark in the educator's toolbox of instructional paraphernalia is that of graphic organizers.

The instructional practice and usefulness of incorporating graphic organizers into an educator's repertoire of strategies has been intensively studied and proven to be a recommended instructional practice (Katayama & Crooks, 2003). However, the theoretical and empirical research from which this conclusion was derived has been almost exclusively based on the teacher as an instructor and the student as a passive receptor of the information model. To this date, miniscule research has been conducted regarding the academic significance graphic organizers have on students receiving their education exclusively via on-line instruction (Hashemzadeh & Wilson, 2007). Therefore, the researcher has attempted to ascertain what effect the use of graphic organizers had on the academic achievement of high school students using an online, computer-based curriculum in United States History, as measured by a United States History End-of-Course Test (EOCT) pretest and posttest.

Background of the Study

Classroom instruction has historically relied upon a textbook as the cardinal source of curriculum used in delivering instruction. Traditionally, teacher directed lessons and assignments have been derived from a textbook with students utilizing their text as

the resource for completing assignments. For most people, textbooks represent a form of certified official knowledge to be referred to and integrated into learning exercises (Issitt, 2004). The benefit of using graphic organizers to improve textual information when reading textbooks for information in the traditional classroom setting has been studied extensively. Generally, research supports the use of visual organizers to increase comprehension (Chang, Sung, & Chen, 2002). However, there has not been much attention given to studying the effect graphic organizers have on increasing comprehension when students receive instruction in a non-traditional setting.

In traditional classrooms, students work independently, in small groups, or even in large groups. Usually, they have access to the teacher who is available to clarify or explain concepts to those who are struggling with particular issues. Many traditional high school classes are characterized by chalkboards and student-teacher instruction, commonly referred to by Hashemzadeh and Wilson (2007) as the chalk and talk method.

Conversely, in a true online setting, where students receive the majority of their information via the computer, or in a blended learning environment, where students receive limited support from their teacher, students commonly progress at an individual pace and are at any given time studying different aspects of the subject independent of teacher assistance. Therefore, a true online environment and a hybrid online environment characterized by students progressing autonomously of other students and teacher assistance are typically not conducive to debate or classroom discussion. The study of the effect of graphic organizers on the academic achievement of high school students utilizing a computer-based curriculum is essential because it will examine the effect graphic organizers have on the academic success of high school students enrolled in a

non-traditional classroom. In this type of classroom, students work independently of their teacher and of their peers. Also, there is little debate or classroom discussion.

The Problem Statement

The purpose of this study was to investigate the effect of graphic organizers on the academic achievement of high school United States History students using an online computer-based curriculum in a blended learning environment, as measured by a United States History End-of-Course Test pretest and posttest.

Null Hypothesis

High school United States History students who receive instruction via an online, computer-based curriculum in a blended learning environment using graphic organizers will not perform significantly higher on the United States History End-of-Course Test than high school United States History students who did not receive instruction using graphic organizers.

Significance of the Study

Theoretical framework

While new technological advancements have changed the types of tools and techniques used by educators in delivering instructional content, the cognitive process or the manner in which humans receive, process, and interpret information has been studied in depth for decades. The past work and research of cognitive theorists including Jean Piaget and Lev Vygotsky have provided educators with a plethora of empirical evidence regarding the process in which students acquire, assimilate, and accommodate stimuli in the process of forming new ideas or resulting in cognitive development (Carr, 2008). While the theories propagated by the aforementioned theorists have spun fiery theoretical

debates in the past as well as in the present, their work has laid a foundation for understanding cognitive development.

This research is grounded in the cognitive theory of learning and those educational practices that embrace this theory. The cognitive approach to learning focuses on the learner's age, life experiences, and social interactions. These factors influence and shape the learner's acquisition and creation of knowledge. Using cognitive approaches in instruction, the researcher investigated the impact on the academic achievement of his students. The cognitive theory will be discussed further in Chapter Two.

Implications

The use of strategies to help students improve their cognitive development, or lack thereof, has been a major focus of educational research and has important implications for teachers. Current theories and research on the effect of graphic organizers on academic achievement generally support the use of graphic organizers (Katayama & Crooks, 2003). Although research affirms the usefulness of graphic organizers when applied to learning, there are now new arenas where additional research is warranted because of the evolution of technology and instruction.

Many high school teachers have in the past relied upon textbooks entirely for information and instruction. This practice has been the standard because, until recently, it was the most pragmatic way of packaging the subject curriculum and distributing it to a vast number of students (Issitt, 2004). However, with the advent of the internet and with the advancement of technological information systems, information that was once restricted to the print medium is available from a vast array of outlets, including but not

limited to personal computers, CDs, and the internet. The research is exhaustive with studies evaluating the effect graphic organizers have on the academic success of students who use them in conjunction with textbooks. However, there remains a need for examining the relationship graphic organizers have on student success when students are obtaining their information from an online format (Hashemzadeh & Wilson, 2007).

Moreover, a growing number of high school classrooms no longer fit into the traditional high school classroom paradigm. More and more teachers have become facilitators of learning as opposed to the primary source of information which has been historically the norm in American secondary classrooms. The process of disseminating academic content, which is to be mastered by the student to show competency in his or her academic area, has shifted away from the teacher in many classrooms and is now being dispersed through computer-based delivery systems. In the present-day instructional environment, where many high school students are now enrolled to some degree in online courses within the traditional classroom, the researcher recognized the necessity to focus once again on the utility of students using graphic organizers to increase their academic success. This study was significant because its results were valuable in demonstrating the effect graphic organizers had on student comprehension among those receiving instruction outside of the traditional setting.

Applications

The conventional classroom, pictured with the teacher positioned in front delivering information to students through lengthy lectures as they write a vast amount of notes, no longer exists in some modern-day high schools. Contemporary students are receiving instruction in a variety of ways, which would not have been possible in times

past (June, 2007). More and more students are enrolled in courses entirely or partially delivered via online instruction, and teacher guidance is referred to as blended learning. Considering the number of schools offering online courses growing each day, we might even consider the tried and tested techniques and tools used by educators through the years to be obsolete. Do they remain beneficial to present day students (June, 2007)? Will students continue to benefit from tools that help them organize information in a way that makes the information easier to comprehend in this high technological environment? This research project was important because it examined the impact graphic organizers have on the academic success of high school students who received their instruction entirely in a computer-based, blended online learning environment. It was broad in scope as many types of graphic organizers were employed by the students including Venn diagrams, semantic maps, timelines, and a vast array of other visual configurations used to facilitate comprehension. Perhaps most importantly, this study was significant because its results were valuable in demonstrating the effect graphic organizers had on student comprehension and because it focused on those receiving instruction outside of the traditional setting in an online, blended learning environment.

Overview of Methodology

The convenience sampling method was employed in selecting the subjects for this research study because the population of subjects available was limited by the number of persons assigned to the facilitator's United States History classes. The researcher had no control over whom or how many students would be assigned to his class as the academic coordinator of the center made all class assignments. During the 2006-2007 and 2007-2008 academic school years, the total population for this study consisted of 60 students in

the researcher's United States History classes.

Two groups consisting of 30 students each were selected to participate in the study. Group I, the treatment group, received instruction in United States History exactly as Group II, the control group, with the exception that each lesson was being coupled with a graphic organizer. Therefore, students in Group I were able to record their notes in a graphical or pictorial manner because they were provided organizers in advance of each lesson by the facilitator. They were instructed to read the computer-based material as directed in their syllabi and fill in the correct information in each field of the corresponding graphic organizer. Group II, the control group, was made up of 30 students enrolled in the teacher's United States History course during the 2006-2007 school year. Those students received instruction in United States History via computer-based instruction in the same manner as Group I except that graphic organizers were not provided as an augmentation to their lessons.

The online computer-based text accessed by the students in both Group I and Group II had many hyperlinks throughout that directed the learners to an array of websites. There were a variety of didactic purposes for inserting the hyperlinks; they provided students access to interactive maps, interactive historical lessons, video clips, and WebQuests. Because of the availability of the internet, class members had to complete a WebQuest on a topic related to United States History. Some chose to design a WebQuest that future students would complete when taking the class. The project accounted for twenty-five percent of the student's final grade. In addition, students were required to complete an array of tests for each module in their syllabi by using USATestPrep. This online program also provided students with diagnostic tests and

challenging academic games designed to prepare them to take all of the state's mandatory academic tests. Students emailed their scores to the facilitator after completing their assignment.

Both Group I and Group II were given a pretest and a posttest. A United States History EOCT was used as the testing instrument for both groups. The assessment used as the pretest and posttest was adopted by the Georgia Department of Education and used to test students' competence in United States History in 2004. The statistically reliable and valid EOCT used as the pretest and posttest continues to remain aligned with the current Georgia Performance Standards (GPS), therefore qualifying it as a reliable and valid testing instrument used in this study.

Operational Definitions

Blended learning: "Blended learning refers to a method of instruction that utilizes two or more complementary approaches to teach the same material" (Bodie, Powers, & Fitch-Hauser, 2006). In giving examples of blended learning, these authors add, "When instructors use traditional lectures combined with activities, discussions, online modules, and or textbook supplements, blended learning is being used" (p. 120).

Chunking: "Largely attributed to the work of Miller, chunking refers to the process of organizing and grouping small units of information into larger clusters" (Bodie et al., 2006, p. 122).

Computer-based Curriculum: This curriculum includes a wide array of educational resources which can be obtained via a computer. It will be loosely defined to encompass both online resources, those resources available by accessing the

internet through a computer that is connected to a server or network of computers by an electronic connection, as well as resources which can be obtained on a computer without having access to the internet.

Cuing: This is a technique of eliciting personal memories through the use of cues, which includes single words, word phrases, and images.

E-learning: This is a mode of instruction and learning. “Essentially, e-learning is an alternative way to teach and learn” (Alonso, Lopez, Manrique, Vines, 2005).

End-of-Course Test: This test was crafted by the Georgia Department of Education to measure students’ proficiency in core subject areas relating to the GPS.

Georgia Performance Standards: The standards were developed by the Georgia Department of Education. Along with practitioner input, these new standards provide clear expectations for assessment, instruction, and student work.

Graphic Organizer: This term will be used extensively throughout this study. It will be used in a broad sense referencing an array of visual representations of concepts which aid students in organizing, understanding, and applying information. “Graphic organizers are visual and spatial displays designed to facilitate the teaching and learning of textual material through the use of lines, arrows, and a spatial arrangement that describes text content, structure and key conceptual relationships” (Ae-Hwa K., Vaughn S., & Shangjin Wei J, 2004, p. 105). For purposes of this study, graphic organizers may include Venn diagrams, story maps, cognitive maps, semantic maps, and numerous other types of visual graphic outlines.

Long-term Memory: This memory is created and can last for a life time.

Online Courses: “Online courses are a type of distance education. The format goes by a number of names: e-learning, internet learning, distributed learning, networked learning, tele-learning, virtual learning, or web-based learning” (El Mansour & Mupinga, 2007, p. 3).

Scaffolding: “Think of scaffolding as a way of helping students move from initial difficulties with a topic to a point where, with help, they come to perform the task independently” (Elliott, Kratochwill, Cook, & Travers, 2000, p. 55).

Schema: “Schema is a psychological term widely used in interpreting people’s understanding of the world. It refers to a storage unit of organized knowledge in the mind. All schemas stored in one’s mind are one’s total knowledge” (Liu, Yu, & Lin, 2007, p. 13).

Short-term Memory: This memory fades away within seconds or hours.

Working Memory: “Working memory is a complex system that represents an interface between memory, attention, and perception, and is defined as the ability to hold task-relevant information in mind long enough to use it to attain a task-relevant goal” (Scherf, Sweeney, & Luna, 2000, p. 1045).

CHAPTER II: REVIEW OF RELATED LITERATURE

Graphic Organizers and Cognitive Processes

There is general agreement, no matter the origin of innate intelligence, that cognitive processes have to be acquired (Haywood, 2004). The human mind is the cognitive processing organ which converts sensory input into knowledge. Then that knowledge is stored in memory Hoy and Miskel (2008). Speaking of the role of the cognitive processes, Haywood (2004) says, "Overall, cognitive processes help one to organize the world, to understand it in symbolic and representational terms, and ultimately to manipulate symbols, concepts, and abstractions rather than relying on concrete objects in space" (p, 235). There have been differing theories introduced through the years by educators and psychologists describing the processes included in and required for cognitive development. Having included several theorists who have studied cognitive development, this study was grounded in the theories propagated by Jean Piaget and Lev Vygotsky.

For Piaget, cognitive development was defined as passing through four stages or periods in a sequential manner. The age at which one passes through each stage may vary, but the sequence will always remain constant. Piaget included the following cognitive developments among the four stages: sensorimotor, preoperational, concrete operational and formal operational period (Elliott, 2000). For each stage of development, Piaget listed outstanding characteristics that would be evident in an individual's cognitive process. According to Haywood (2004), "Piaget believed that every child had the rather daunting developmental task of generating his/her own personal 'logic structures'"

(p.235). Piaget also included four interacting influences which aided individuals through the four stages of development. As recorded by Elliott (2000), the four influences include maturation, experience, social interactions, and equilibration.

Equilibration is the term used by Piaget to describe the balance between assimilation and accommodation. These terms were used to describe how individuals take in new information and assimilate that information to fit existing cognitive structures. As the information is being assimilated, many times it changes existing cognitive structures, resulting in the learner shifting prior cognate structures to accommodate new ones. Haywood (2004) says this process is referred to as "cognitive conflict," or "the necessity to resolve discrepancies between new information and knowledge that is already stored away" (p. 235).

Whereas Piaget focused on the individual forming cognitive structures, Lev Vygotsky placed more importance on shaping cognitive development through social interactions with others, which was referred to as "social origins of the mind" (Elliott, 2000). Instead of emphasizing equilibration as Piaget did in the development of the cognate process, Vygotsky stressed the importance of social interaction, especially those interactions with adults which are able to guide the learner in the acquisition of knowledge. While Piaget believed that cognitive process was influenced to a large degree through accommodation and assimilation, Vygotsky stressed the key to learning included brain development in concert with social-cultural interactions (Elliott, 2000).

Employing graphic organizers to aid students' cognitive development fosters and facilitates logical thinking through visually assisting students in assimilating and accommodating newly acquired information as described by Piaget. As the student fills in

the fields of the graphic organizer, he or she can request clarification from other students or the teacher. When students communicate with peers, the social aspect of cognitive development promoted by Vygotsky and Piaget is being accomplished. When directions or clarifications are requested of the teacher, adult leadership, that plays a pivotal role in cognitive development as expressed by Vygotsky, is being carried out in a practical manner.

In summarizing some of the repeating guiding principles of sound cognitive approaches in teaching, Hoy and Miskel (2008) provide a summary of many of the cognitive exercises provided for through the use of graphic organizers. Graphic organizers, therefore, can do the following:

- Guide perception and attention by previous knowledge.
- Help students focus on the most important information.
- Help students make connections between new information and what they already know.
- Provide students with opportunities to use both verbal and stories and visual images.
- Present information in an organized and clear fashion (p. 65).

Graphic Organizers and Computer-Based Instruction

Exponential Growth

Amazingly, less than 10 years ago, there was not a state board of education in the United States that used the internet either entirely or in a blended or hybrid fashion to provide course work for middle school or high school students (Patrick, 2007). The first state-sponsored virtual schools, schools where students earn high school credit via the

internet, began in 2000 in the states of Florida, Kentucky, Louisiana, and West Virginia (Bowker, 2007). Cavanagh (2007) envisions the use of computers and the internet in the K-12 education setting growing exponentially in the near future and for an indefinite period of time, especially in the area of blended learning, which combines internet-based lessons with traditional instruction.

According to a report cited by Cavanagh (2007), "K-12 Online Learning: A Survey of U.S. School District Administrators," released by the Sloan Consortium in March of 2007, some 63% of the public school administrators responding to the survey reported they were offering some form of online learning. In addition, 20% said they plan to offer some form of online learning classes in the near future. Many of those administrators responding to the Sloan Consortium survey reported they view the combination of site-based instruction and online instruction favorably as opposed to individualized online learning because of the increased interaction between the student and the teacher in the blended learning environment. In addition, they noted that the blended approach to integrating an online curriculum provided far more assistance for students which would most likely result in higher comprehension (Cavanagh, 2007).

MacDonald (2007) cites the findings included in a survey counted by the Sloan Consortium in 2007. During the 2004-2005 and 2005-2006 school years, approximately 700,000 public school students in grades K-12 were enrolled in at least one online course. The overwhelming majority of those students enrolled in online courses while in public school were at the high school level. Elementary and middle school students availing themselves to online courses make up only a fraction of those enrolled in distance education, while 70% of those enrolled in online courses are at the high school level

(Cavanagh, 2006). Based on the same Sloan Consortium report, while the number of public school students enrolled in computer-based online courses is enormous and continues to grow, their number only represents 1.5% of the 48 million public school students.

As the trend continues, the number of students enrolling in online courses will be stunning and somewhat overwhelming. In reference to the 2007 survey by the Sloan Consortium, educators have seen a tenfold increase over the previous six years of public school students enrolling in some type of online class (MacDonald, 2007). For various and sundry reasons, many states are cheering and welcoming distance learning; for example, the legislature in the state of Michigan in 2006 passed legislation requiring all students in the state's public school system to integrate at least one online course into their graduation plans (MacDonald, 2007). In 2006, a total of 24 states were accessing some type of online program with some states creating their own "virtual" high schools. The number of students enrolling in state sponsored online programs is increasing 20 to 25% per year (Cavanagh, 2006).

With the growing popularity and surging enrollment in online courses by public and private school students predominantly at the high school level, supervision or oversight is needed to insure instructional rigor (Rivero, 2005). Numerous universities play a pivotal role in offering many of the courses that high school students participate in and admit into their programs students who have earned high school credits via internet courses. These same universities are now beginning to take a closer look at the academic demands and rigor of the courses offered to high school students by way of the online avenue. For example, the University of California system is now requiring online

providers of academic courses to high school students to provide the university with course syllabi in an attempt to hold the providers accountable for requiring high academic standards of their students (Cavanagh, 2006).

According to the National Education Technology Plan referenced by Rivero (2005), to ensure proper instruction and rigor of learning, schools should put in place the following actions:

- Provide every student access to learning
- Enable teachers to participate in training for e-learning
- Encourage the use of e-learning to meet No Child Left Behind requirements for highly qualified teachers, supplemental services, and parental choice
- Explore creative ways to fund e-learning
- Develop quality measures and accreditation standards for e-learning to mirror those required for course credit (p. 41).

Student Concerns

Due to the advancements in technology, the number of courses being offered via the internet has grown immensely. Consequently, the number of students enrolling in online courses has also increased (Nian-Sing & Kan-Min, 2008). With the introduction of new technologies, which enable new delivery methods of instruction to be taken advantage of, it would be only natural for unknown barriers to student achievement and progress to manifest in this new instructional delivery environment. The latest hindrances to the quality of students' education and to the quality of the teachers' instructions must be addressed in an effort to foster student satisfaction and academic advancement among this segment of the student population (Gunter, 2008).

Based on the phenomenal growth of computer-based course offerings in the recent past at the college level and now at the K-12 level, it is obvious that this rapid growth will continue. Therefore, the need to adjust instructional methodologies will also increase as problems present themselves (Gunter, 2008). Students presently enrolled in online courses consistently report the most negative aspect of online instruction and the reason for not doing well in computer-based courses is the lack of social interaction with other students (Rivero, 2005). A feeling of isolation is being reported due to a lack of interaction between students and their peers as well as a lack of communication they have with their teachers (Rivero, 2005).

Recognizing the need to adjust instructional methodologies, Gunter (2008) suggests, "It is imperative that educators understand and employ strategies that aid in creating effective online courses that engage, motivate, and increase student retention and cognitive learning" (p. 196). Nian-Sing and Kan-Min (2008) similarly add, "Researchers and decision-makers in academic institutions need to identify factors that effect learners' satisfaction in the e-learning process in order to ensure that programs are well designed and successfully run with desired outcomes" (p. 120). As the popularity of online computer-based courses increases, the need to gauge the satisfaction level of students as relating to the course, its content, and learner satisfaction also increases (Bixler & Spotts, 2000). That satisfaction should deal with the course in its entirety including content and the manner in which the course is delivered (Nian-Sing & Kan-Min, 2008).

Pedagogical Changes

The traditional educational establishment has concentrated on transferring the teacher's knowledge of subject material to the student (Alonso et al., 2005). El Mansour

and Mupinga (2007) state, “Traditionally, learning has been assumed to take place in a classroom or face-to-face environment where the instructor and students are physically together” (p. 2). Many times what the teacher knew was not relevant to what the student needed to know; however, the information lacking by the teacher was needed by the student. The use of the internet has radically changed the teaching paradigm. Students would have, in the past, been oblivious to their relying strictly on the instructors’ knowledge. Now, they are rapidly able to access information through the internet (Alonso et al., 2005).

With the combining of the traditional teaching model with the online model, there has arisen a need to create and/or articulate a design for learning which is suitable for this high-tech instructional environment. Alonso et al. (2005) state, “There is serious dysfunction between the profusion of technological features that are put forward and the shortage of non-existence of teaching principles for e-learning” (p. 218). Trusted instructional pedagogies, which have been employed rewardingly in the past by educators, may or may not be sufficient in this new, technically integrated, academic setting. In regards to formal and informal learning, which have an extensive tradition, Mason (2005) adds that the emerging technological advances such as online communications increase the experiences of formal and predominately informal learning to a new level and put a modern or up-to-date-spin on the blend of the two learning modalities. Falconer and Littlejohn (2007), when surveying the present educational landscape with the birth and surge of blended learning, make the following observation: “The concept of design for learning has arisen as education faces up to the impactions of modern pedagogy, student diversity, and the affordances of information and

communication technologies" (p. 41).

While educators are cognizant of the pedagogical difficulties facing them and their students in this new age of technological advancements, their attempts to create pedagogies which support optimal learning in this blended education environment is still in the experimental stage. Again, Falconer and Littlejohn (2007) comment on the slow creation of instructional strategies to meet students' academic needs in the blended learning environment: "However, few representations to date have succeeded in capturing the essence of a good piece of teaching" (p. 41). Rather than relying on the internet to deliver the totality of the curriculum, the instructor needs to integrate some type of vibrant component into the blended environment. After observing the amount of strategies teachers are employing while attempting to provide students a quality education within the blended learning environment, Falconer and Littlejohn conclude, "Ways of representing designs as dynamic process, rather than static products, may need to be developed" (p. 41).

The research by Ginns and Ellis (2007) indicates the perception a student has of learning coupled with the quality of the instructional methods employed by the educator has an influential effect on the students' reflection on the actual learning experience. Ginns and Ellis further hold that this reality is also true when applied to students who receive their education via a distance education model, in which courses are taught using an online model. In addition, with the insurgence of the blended model of delivering coursework, there remains an absence of empirical data, regarding the influential effect the blended model has on students' perception of their educational experiences. Related to the blended education setting, Ginns and Ellis found, "There is currently little research

about how predominantly campus-based students' experiences of the on-line part of their course are associated with their experience of the course as a whole" (p. 53).

There is evidence that teachers can improve student satisfaction and success when completing computer-based courses by creating a community atmosphere (Walker & Kelly, 2007). Not only do these interactive opportunities provide an occasion to correct information, clarify vague issues, and offer praise for a job well done, they eliminate the feeling of isolation which, in turn, has been shown to increase student satisfaction, resulting in an increase in academic achievement. Noted in traditional classrooms, one of the most effective strategies an instructor can employ to improve students' academic achievement is to build confidence and a community-like atmosphere where students feel part of a team or family (Aragon, 2003).

While students are typically working independently in an online, computer-based program, independence should not be considered synonymous with isolationism (Northrup, 2002). Whether in an online setting where students are scattered throughout a regional or geographical area or in a situation where students are grouped together in a somewhat traditional manner enrolled in an online course, timely teacher interaction has been noted to be one of the foremost factors of student success (Northrup, 2002). Feedback from the teacher is critical among students enrolled in an online course. When students do not get feedback from their teacher, they tend to give up and will not be able to reach their true potential (Nian-Sing & Kan-Min, 2008).

The Changing E-learning Environment

Notwithstanding the incredible advancement of e-learning in the public school setting, Nancy Nestor-Baker believes the use of e-learning remains in an embryonic state.

Nestor-Baker is a member of the Westerville school board in Ohio, which has turned to the e-learning model to meet the needs of a diverse student population (Rivero, 2005). With the exponential growth of computer-based learning, there is beginning to emerge a discussion over the importance of content and the importance of student-to-student and student-to-teacher communication. As recorded by Rivero, John Bailey is a former director of the U.S. Department of Education's Office of Education Technology who now serves as a senior policy advisor with the Department of Commerce. He makes the following observation concerning the importance of the content in a computer based setting: "People have begun realizing that even with the best connection and the fastest computer, without the content, it's not useful" (p. 41).

However, there are those who also recognize the necessity of offering a divergent curriculum which includes both content via the computer and a human touch as well. Again referring to Rivero's (2005) study, Burck Smith, CEO and the co-founder of Smathinkin, an online tutoring company, comments concerning digital content that "this is the place, in my opinion, technology has the most limited ability to increase student performance and decrease costs" (p. 41). Burck Smith further argues, "Using courseware, adopting electronic textbooks, and intergrading digital content into the curriculum merely replaces what is already done with traditional textbooks and with traditional instruction in a traditional environment" (Rivero, 2005, p. 41). In addition to the digital content, Bodie et al. (2006) argue that there is no substitute for those in a child's life who can encourage him to improve his academic performance. Therefore, Bodie et al. visualize remarkable potential in coupling digital delivery systems which encourage and/or require a vast amount of communication between teachers and the students' parents and between the

students and their teacher.

One may have a mental image of taking an online course in the traditional distance learning setting. When picturing students taking an online course, for many, however, the delivery format is changing daily. In the scenario stated, students were enrolled in online courses independently and isolated. This paradigm of online learning is beginning to shift somewhat to what is referred to as blended or hybrid online learning (Hughes, 2007). The term *blended learning* has been used to refer to an array of learning strategies combined to produce yet another instructional strategy. However, when associated with the internet and online learning, the term indicates combining traditional online learning with traditional teacher assisted learning (Oakes & Green, 2003).

At the present, for most, the meaning of the term *blended learning* involves two ingredients: online and face-to-face teaching (Mason, 2005). However, the definition of blended learning can be expanded to encompass a combination of both formal and informal learning (Mason, 2005). When asked the definition of *blended* in blended learning, Mason offers the following analysis in the form of four questions, “Is it technologies? The teaching methods? The learning experience for the students? The locations of the learning events?” (p. 217). His conclusion is that all four questions can and have been considered part and parcel of the blended learning setting.

Patrick (2007) envisions that the largest area of growth in the online learning environment in K-12 education is definitely in the blended learning environment. The blended learning experience affords students the best of both educational worlds (Oakes & Green, 2003). These two worlds, according to Oakes and Green, include the world of the traditional setting where students have access to a teacher and the world of the

internet where the lessons can be augmented and expanded as never before. The blended environment will soon soar ahead of the true online learning setting where learners are taking classes alone or in small groups via the internet in the public school setting (Patrick, 2007). However, the extent to which the blended learning model is being used in public schools today is not known (Pape, 2006).

The focus on any learning setting should be on discovering the optimal pedagogical technique required to teach concepts in that particular environment so as to get the most out of each student's cognitive ability (Bodie et al., 2006). However, the effective strategies needed by students to succeed when enrolled in resource-based learning environments are for the most part lacking (Tergan, Graber, & Neumann, 2006). Because of the amount of information contained in many online programs, students find themselves suffering from what Tergan et al. refer to as, "cognitive overload and connectional and navigational disorientation" (p. 333).

Bradford, Brown, and Cocking (as cited by Tergan et al., 2006) make the following observation, "Helping students to organize their knowledge is as important as the knowledge itself, since knowledge organization affects students' intellectual performance" (p. 328). The theory supporting the use of a variety of graphic organizers to enhance cognitive processing of complex and sometimes even effortless subject matter is propagated because graphic organizers enable students in systematically grasping the relevance and connectivity between the concepts being taught; therefore, learning will be increased.

Tergan et al. (2006) have suggested three significant ways in which graphic organizers can be used to foster learning in an online classroom environment.

Interestingly, two of their suggestions involve the process of increasing cognition after the students have completed their assignments via the computer. When students receive their instruction via the computer in an online computer-based program, they are for the most part working independently, progressing at their own pace. Teachers or facilitators sometimes find it difficult to review or discuss different aspects of the curriculum with the students because of the vast amount of information presented and the lack of a map to guide the student in deciphering what information is relevant and what is irrelevant.

In contrast to this haphazard manner of teaching and learning in an online environment, graphic organizers are tools which can be used in highlighting and honing in on the content material which should be mastered by the students. With a graphic organizer map in place learners will be led along a route which will guide them in successfully acquiring the material considered to be crucial in the learning process (Ritchie & Gimenez, 1996). At the conclusion of the journey, those same learners will be cognizant of the facts and circumstances surrounding the material they were intended to master.

Available Research

There has been an abundance of research conducted in the past which has focused on the effectiveness of online courses; most of the research has focused on comparing traditional classrooms to online classrooms (Young, 2006). However, to date, there is meager research focusing on effective strategies educators must utilize to insure the online instructional setting is more conducive to improving student satisfaction and academic achievement (Young, 2006). Several studies exist which compare computer-based learning to face-to-face-learning and compare students' opinions of online learning

with the traditional format; however, these studies involve higher education students which may or may not represent the findings among high school students.

Published studies which actually test and report the effect technology has on students' academic achievement when receiving instruction via an online computer-based curriculum have been meager (Hashemzadeh & Wilson, 2007). As said by Bowker (2007), a number of studies comparing the effects of blended learning with face-to-face-learning have failed to show either a positive or negative correlation differential between the two modalities of instruction. Except with the improvements seen when using technology with at-risk children, other studies have been conflicting as to the value of students using computer based programs (Hashemzadeh & Wilson, 2007).

According to Bowker (2007), several studies that focused on students in K-12 grades failed to show a statistical difference between students who received their instruction in a computer based online format as compared to students taught by the way of the traditional face-to-face format. However, Ritchie and Gimenez (1996) conducted a study consisting of fourth grade students engaged in computer-based instruction. Graphic organizers were embedded and made part of the computer-based instruction model. The findings of this study indicated that both the students' short-term and long-term memories increased when graphic organizers were embedded in the curriculum.

Boon, Fore, and Hagan-Burke (2006) found when students with learning disabilities in secondary inclusive social studies classrooms used Inspiration 6 software to design computer-generated cognitive organizers, their ability to comprehend social studies content information increased substantially. The increase in content information comprehension was compared to students who received instruction using the traditional

textbook instruction model exclusively without the implementation of graphic organizers. The study further identified those students in the same inclusive high school social studies classes who had no emotional or learning disabilities. When those same students also used the Inspiration 6 software to design cognitive organizers, they benefited from the cognitive organizers as their results mirrored those exemplified by those with learning disabilities (Boon et al., 2006).

Similarly, according to Blankenship, Ayres, and Langone (2005), when students with learning disabilities accessed computer based software to create cognitive organizers along with traditional textbook instruction, their knowledge, retention, and understanding of content-specific information improved (as cited by Boon et al., 2006). The implementation of content organizers into the curriculum has the possibility of significantly increasing content area learning and student achievement in the social studies curriculum. Oakes and Green (2003) refer to a Thomson Netg's study which suggests that students' academic success and rate of learning will increase if a blended method of instruction is used as opposed to employing a single-method delivery alternative.

Graphic Organizers and the Construction of Knowledge

The Brain and Graphic Organizers

While the evidence thus far concerning the entirety of how the brain acquires, processes, organizes, remembers, and forgets information is not conclusive, many new discoveries through the advent of modern technology and medical imagery are providing valuable information to scientists and educators alike to help them understand how the brain processes information (Gulpinar, 2005). It has been discovered that the human brain

is never static; it is always re-constructing itself in order to meet the cognitive demands placed upon it by the learner (Gulpinar, 2005).

Concerning the development of the human brain, Day, Chiu, and Hendren (2006) cite a plurality of research, including research from advanced CT scans and postmortem sampling, which indicates the human brain reaches full adult size or volume by or during puberty. Although the organ reaches full size or volume at the onset of puberty, the structures within the brain continue to mature into adulthood. Day et al. note that it is precisely during adolescence that the brain begins to make and strengthen new connections. Again based on the latest findings, Day et al. surmise during adolescence "…complex matrices, synapses, and important pathways, indicative of higher order processing, are being established and interwoven" (p. 193).

Caskey and Ruben (2003) point out, "Studies which are making use of magnetic resonance imaging analyses show that puberty brings a neural growth spurt in certain areas of the brain, such as the parietal lobes that are the seat of visual/spatial ability" (p. 2). Cognitive processing increases when the student is provided and combines visual representations of the subject matter or concepts with verbal representations (Matthews-Morgan, 2007). This process, combining both visual and verbal representations when learning, enables the brain to process more information and to make connections with semantic concepts already stored in the brain, thus reducing the complexity and burden that would be placed on one's working memory if both stimuli were not present (Tergan et al., 2006).

When the functional organization of the brain is considered, recent research indicates that different regions of the brain, more specifically the two hemisphere regions,

the right cerebral hemisphere and the left cerebral hemisphere, specialize in processing experimental information (Gulpinar, 2005). The left hemisphere of the brain, according to Gulpinar, "…operates in a linear, sequential manner with logical, analytical, propositional thought" (p. 301). On the other hand, the right hemisphere does not break down information into sequential components in a linear manner as does the left hemisphere; instead, it appears to process information in a holistic fashion, and it has the capacity to represent information in a panoramic view, viewing the whole as opposed to segments (Gulpinar, 2005). Jensen (2005) contends that too much is made of the right side left side analysis and prefers to picture the brain as a holistic organ or unit with a change in one part having a rippling effect to some degree throughout the entirety of the organ. Jensen sums up his understanding of the brain as follows: "In summary, the brain is a dynamic, opportunistic, pattern-forming, self-organized system of systems" (p. 13).

Memory and Graphic Organizers

Neurophysiologists prefer to describe memory emphasizing foremost as a brain process (Morris, 2006). The term *memory* has historically been defined in terms of the capacity of the learner to encode, store, and retrieve information from an imaginary storage compartment in the brain (Morris, 2006). Fields (2005) adds, "Memories are created when nerve cells in a circuit increase the strengths of their connections, known as synapses" (p. 12). While memory involves recalling information which has been stored, scientists have divided memory into two categories, short-term and long-term memory.

Commenting on short-term and long-term memory, Fields (2005) observes, "In the case of short-term memories, the effect only lasts minutes to hours and then the memory simply fades away. For long-term memories, the synapses become permanently

strengthened" (p. 12). Generally speaking, people place phone numbers which have to be remembered only until the call is made in short-term memory; however, phone numbers which are remembered over time, such as one's own, are stored in long-term-memory.

Research also indicates there are two primary sections responsible for memory. Temporary facts, as well as short-term memory, are stored in the section of the brain called the hippocampus (Tse et al., 2007). Short-term or working memory holds information just long enough for the brain to process and store the information for a short period of time. Hoy and Miskel (2008) estimate that only a small amount of information is capable of being stored in working memory and only for a maximum of twenty seconds.

A study conducted by Hollingworth (2004) investigating the effect of visual representations on short-term and long-term memory appears to support the conclusion that graphic or pictorial representations of material increases both short-term and long-term memory. The experiments indicated when students viewed online scene representations the capacity of their short-term memory and long-term memory was increased significantly, well above chance.

According to Tergan et al. (2006), learning, connecting newly acquired knowledge and ideas with stored memory and problem solving, can be enhanced through the use of external visual organizational semantic maps which mimic semantic memory. Research also indicates students' short-term memory storage is increased in increments of time and capacity when students view pictorial images as opposed to only reading or hearing the same abstract information (Tergan et al., 2006).

Research reveals that unless newly acquired knowledge is stored in either short-

term or long-term memory in some form of semantic or rational manner, it will be of little or no use to the learner in the future as the individual will be unable to retrieve the knowledge. The inability to remember learned material is in part due to improper storage in that no significant tab or label was applied to the information (Jensen, 2005). Visual organizational tools enhance the memory process by increasing the likelihood of storing generated knowledge in the brain in such a way that fosters quicker and easier retrieval (Tergan et al., 2006).

Tse et al. (2007) point out that long-term memory is stored in a deeper section of the brain called the neocortex. When data is stored in long-term memory, the brain has learned to respond to that data. Each time the memory is activated, the brain has an easier task to activate that memory (Jensen, 2005). In addition, the efficiency of retrieving information from long-term memory is dependent upon how well the memory was initially stored. Hoy and Miskel (2008) have identified three significant procedures or processes which will aid in storing and retrieving information from long-term memory. Those processes include elaboration, organization, and context.

Again according to Hoy and Miskel (2008), elaboration can be accomplished through adding the new information to prior existing knowledge through the process of chunking or devising handles or cues to be used in storing and retrieving the information. Therefore, elaboration is made possible through organizational techniques including graphic organizers in which students create and draw pictures, diagrams, and illustrations to illustrate relationships and to aid in connecting the newly gained information to an existing schema.

Not only can concept maps be used to aid the acquisition, storage, and recall of

information, they also serve as a catalyst in enabling students to verbalize in a coherent manner what they have gained through the cognitive process. The act of verbalization, which may occur when discussing the organizer or map with the teacher after completing a lesson, actually assists the student in internalizing the information, thus expanding again short-term and long-term memory (Tergan et al., 2006). According to Day et al. (2006), the wisdom of using graphic organizers is substituted by research of the adolescent brain. They found that the adolescent brain, because of the physiological changes, needs constant adult guidance and support.

Hoy and Miskel (2008) explain the positive effects of graphic organizers on long-term memory. They comment, “In long-term memory, some information is stored and interrelated in terms of images and schemas-data structures that allow us to represent large amounts of information, make inferences, and understand new information” (p. 57). He likens memory to reactivating or reconstructing that which was stored in long-term memory. The accuracy of the recall is due to a large degree on how the information was first stored.

Prior Knowledge and Graphic Organizers

The use of graphic organizers assists students in linking newly gained knowledge to prior knowledge (McMackin & Witherell, 2005). Commenting on the importance of prior knowledge, Gholson and Craig (2006) stated, “Learners experience new phenomena, interpret experiences in terms of what they already know, reason about new experiences, reflect on experiences, and reflect on the reasoning process itself” (p. 122). As to the importance of activating prior knowledge, Carr (2007) suggests that when the student has the opportunity to link new ideas with ideas which have already been

processed and stored in long-term memory, the student is provided with an occasion to search for patterns which have been stored in the brain, making learning easier and more meaningful. Jensen (2005) suggests it is imperative for educators to be aware of how the brain makes sense out of information even if random thought pattern-making; therefore, it is very important to engage students in activities where they are made aware of the big picture.

Zull (2002) points out that abstract and theoretical ideas which are often presented to students learning content information, have meager meaning if no neuronal networks are stimulated by the learners' concrete experiences. Carr (2007) indicates three things that research has established which is known about prior knowledge: "(1) prior knowledge is present, (2) it is a fact of the learner, and (3) it is the beginning of new knowledge" (p. 2). The challenge for the teacher is to provide the students with tools which will assist them in discovering or recalling prior knowledge and connecting it to the new ideas and information the student will be introduced to in the lesson (Jensen, 2005).

When graphic organizers are used to build a structure of prior knowledge, the student has a space of time to fine-tune his brain for the information he is about to learn. Carr (2007) notes, "By helping students develop preliminary patterns of organization and reorganization through the activation of prior knowledge, the time needed for the student to assimilate new information decreases" (p. 2). Because it is important for the student to be engaged in the learning process, no one can assist with this task better than the teacher by adjusting the learner to focus on prior knowledge.

Graphic organizers provide cues which enable students to retrieve information

that has been stored in memory (Goddard, Pring, & Felmingham, 2005). The stored information is linked with newly gained concepts, thus creating relational knowledge that results in fuller comprehension (DiCecco & Gleason, 2002). As students review using a previously studied graphic organizer, the review activates prior knowledge which has been stored in memory in a spatial manner. Students are able to recall information as they visualize graphic organizers that have been committed to memory (Ben-David, 2002). When prior knowledge is activated using graphic organizers, studies have shown that comprehension of the material actually increases over time (Katayama, Robinson, Devaney, & Dubois, 1997).

When students study material using graphic organizers, they do not focus on making specific associations or memorizing isolated conceptual facts. Instead, the focus is on how broader associations of the facts are made and how concepts are intertwined with each other (Chang et al., 2002). This visualization of the material serves as a catalyst in facilitating the learning of the overall panorama of the curriculum (Katayama, Robinson, Devaney, et al., 1997).

Schema and Graphic Organizers

Schema is a psychological term which is widely accepted in referring to storerooms of ordered information and to individual methods of storing newly gained knowledge in the mind (Liu et al., 2007). Interpretation of reality is ultimately based on the information a person has stored in his or her schema; however, one must not assume the content is accurate or sound (Jensen, 2005). A person's schema is built as he or she absorbs information; therefore, the more information and experiences one has encountered through life, the more detailed his or her schema will be. According to Liu et

al., “Schemas are organizational units, with simpler units ‘embedded’ within more complex units: schemas are processors, affecting our recall of events, and our ability to learn” (p. 13).

Hummel and Holyoak (2005) observe, “A fundamental aspect of human intelligence is the ability to acquire and manipulate concepts defined by systematic relationships among multiple objects” (p. 153). The process of arranging ideas and concepts in a relational pattern, where one concept seamlessly follows another resulting in a coherent thinking process, is so natural and commonplace that one would assume that it is a simple process. Hummel and Holyoak, however, disagree with the seamless concept. They comment, “But the capacity to conform and manipulate high-level relational representations appears to be a uniquely human ability, a late evolutionary development that develops relatively late in childhood” (p.153).

Scientific research indicates that the brain is capable of retrieving stored information from different sections throughout the brain which normally do not interact due to biological limitations if connectivity exists and the density of that connectivity enables associative retrieval of stored patterns or “schema” (Morris, 2006). Partial fragments of information can be retrieved if association is made based on the schematic process. According to Morris, this high degree of internal connectivity has a recurrent characteristic. Once connections in the brain process duplicate themselves, the schematic process is strengthened and produces even more memory recall and aids in long-term memory.

As relating to an academic setting, often students are required to master subject matter in which they have no prior knowledge; therefore, they do not have a relevant

schema in which to store the subject matter they encounter and, as a result, comprehension is hindered. As students read and encounter information, which does not fit into any previously created schema in the mind, the material may not be remembered because of the lack of connectivity to previously stored knowledge or even worse it may be understood incorrectly as a result of choosing unconsciously to connect the newly gained information with an invalid or erroneous schema (Liu et al., 2007).

While it may take time to build a schema, once it is there new information is associated with a certain schema and can be stored very quickly in the cortex (Morris, 2006). Kalyuga (2006) referred to schema as an organized knowledge structure and has extensively researched the effect of people's schema on their short-term and long-term memory. When students are enabled to make connections between their short-term memory and their long-term memory, the capacity of their working memory is vastly increased as connections are made with the organized schemas which are already present in long-term memory. According to Kalyuga, when this connection is made, short-term memory, which is usually limited, is able to store practically an infinite amount of information.

Readers often associate what they already know with new information they encounter when reading. However, the task of learning or creating memory merely from reading a textbook is an arduous task for most students because of the lack of connecting factors and conditions needed in an optimal learning experience (Jensen, 2005). Albeit, when connections are made within the brain, readers often begin to amalgamate the text they are reading with schema or stored knowledge in the mind, thus propelling the reader to a higher level of learning which involves "reading between the lines" (McMackin &

Witherell, 2005). Alonso et al. (2005) have concluded, “Therefore, learning techniques which relate the new information to, or differentiate it from, previous knowledge improve learning. To this end, conceptual maps and process diagrams organize the information and improve the instruction of mental models” (p. 222). In addition, Alonso et al. have observed, “The use of knowledge organizers activates any previous available schemas related to the material to be learned and improves its integration” (p. 222).

Chunking and Graphic Organizers

Concerning chunking and cognitive psychology, research suggests when small bits of information are combined and synthesized to form a broader body or chunks of information it is easier to recall the information from memory (Bodie et al., 2006). Chunking small bits of information into a particular receptor increases the size of the total body of knowledge; however, when that receptor is accessed by the brain through association, those small bits of information within the larger category, which otherwise could have been lost or forgotten, can be easily retrieved (Cowan, Zhijian, & Rouder, 2004). Based on the pioneer work of G. A. Miller in his research on chunking, combining small segments of information into a larger distinct body of information improves the learning process by aiding students in remembering more information, provides an avenue for accessing and retrieving the information which was stored in memory, and allows for storing and retrieving more information than a person would ordinarily be able to process without using the chunking method of learning (Bodie et al., 2006).

Chunking serves as both a coding device and a triggering device for information. Chunking information is somewhat similar to the schematic process of entering and retrieving knowledge as discussed by Carr (2008). Organized and stored as chunks of

information, our memories are strengthened through a constant bombardment of ideas, concepts, and skills (Bodie et al., 2006).

Proficiency of knowledge occurs when a student repeatedly codes a vast amount of information to be stored with a distinct chunk of information. This process is particularly useful when students are faced with difficult subjects or large bits of information. It has also been noted that information is more readily moved into long-term memory when it has been chunked into manageable pieces of information (Carr, 2008). This movement is due to the process students go through when chunking. Initially, the student codes the information and then searches for the appropriate file to store the information. Once this activity is complete, that particular file or chunk in the brain is called up for filing. Through this process, the student will become very familiar with the bits of information being entered as well as the file into which the information is being stored (Carr, 2008).

Gobet (2005) reminds us that learning is due in significant manner to the time invested by the learner in the process of acquiring and becoming familiar with the information or task to be mastered. However, he is quick to point out that there is a distinct and drastic contrast between studying and practice and tailored practice. Gobet offers the following example to distinguish the differences between practice and what he refers to tailored or deliberate practice: "…playing the piano for fun will not make one a concert pianist. Practice needs to be tailored to the goal of improving performance…this explains why deliberate practice, and not just practice is important" (p. 193). When Gobet's theory is applied to the process of chunking information, it suggests that if a student is unaware of what the important bits of information are, he may spend an

exorbitant amount of limited time bundling incorrect or irrelevant information which will result in little value to the learner in the end of the process.

However, if there is a mechanism in place such as a graphic organizer, it will tailor the student's inquiry in a deliberate and systematic process by helping him identify key elements to be mastered from the provided material. Not only will time be saved, the student, as a result, would put the pieces of the puzzle together in a coherent manner which will aid chunking and, therefore, learning and recalling of the information (Gobet, 2005). Gobet explains how visual templates are used to facilitate the chunking process: "The importance of templates is that they show how higher-level structures can be built from chunks and provide mechanisms for the rapid long-term-memory encoding shown by experts" (p. 187).

Concerning working memory, Hoy and Miskel (2008) specifically find that through the practice of chunking more bits of information can be stored in one's working memory, and, in addition, the information can be retained longer than when chunking is not used. Hoy and Miskel further suggest that when information is chunked together in meaningful units, the learner is capable of storing even more information and keeping it for an even longer period of time in his working memory.

Gobet (2005) points out that in order for transfer of information to occur within the brain there must be an overlap of domains of information or skills necessary in each domain. He cautions educators to vary their curriculum, so that learning will occur across a spectrum of domains instead of in a narrow hierarchal column. When instruction or information is segregated to isolated facts or theories, students will be less capable of drawing connections and associations required for true comprehensive learning to occur.

Scaffolding and Graphic Organizers

It is important that the didactic tools the educator implements are not so simple that the students lose interest; however, it is equally as important that the instructive techniques are not so difficult as to discourage students in their quest for information and learning. Graphic organizers are didactic scaffolding tools that teachers can insert into the curriculum to aid students in the acquisition of knowledge. In this era of technology-enhanced learning environments, the role of scaffolding in facilitating learning is of great interest to educators and researchers alike (Sharma & Hannafin, 2007). Scaffolding techniques in the form of modeling, cuing, coaching, and prompting can be used more regularly when teachers are aware of students' progress (Carr, 2008). Commenting on scaffolding, Fournier and Graves (2002) make the following comparison: "Training wheels on a bicycle are an excellent example of scaffolding. They are adjustable and temporary, providing the young rider with the support he or she needs while learning to ride a two-wheeler" (p. 31).

In an online blended learning environment, acquisition of learning is accomplished primarily by students obtaining knowledge through acquiring information from the computer. In a traditional learning environment, where the teacher communicates with the students on a regular basis through lectures as well as question and answer sessions, scaffolding occurs frequently and freely in both a conscious and unconscious manner (Dillenbourg, 2008). This didactic process, however, does not exist in an online blended learning environment where students work independently of fellow students and in many cases even of the facilitator.

In an online learning environment, it is more difficult for the practitioner to know

when a particular student is in need of assistance without constant contact and engagement. Students need to exchange ideas relating to the curriculum that is being learned. Sharma and Hannafin (2007) observe, “In face-to-face learning environments, dynamic scaffolding obviates the need for a prior understanding since joint understanding is negotiated. However, dynamic negotiation is difficult to replicate in technology-enhanced learning environments” (p. 28). Before a teacher can construct a scaffold which will aid and support student learning, the teacher must have an active dialogue with the student in order to know where a scaffold needs to be placed (Nathan & Barrett, 2004). Without this knowledge, teachers may likely be busy aiding students in areas where no assistance is really needed while neglecting to provide support where critical understanding deficits exist.

Available research indicates computers and computer programs are not able to provide the scaffolding needed to foster specific assistance needed by students (Sharma & Hannafin, 2007). In an online blended learning environment, information gleaned from a graphic organizer provides teachers with a lucid snap shot into a student’s understanding and comprehension of the material being presented and into his or her obtaining knowledge. Dillenbourg (2008) concludes that there is no substitute for the sensitivity of the human expert who can design and prescribe scaffolds in a classroom context. Once the teacher is aware of the comprehension level of the student, scaffolding techniques can be employed to assist the student in the attainment of knowledge. Carr (2008) lists nine examples of scaffolding strategies that assist students in constructing knowledge. These techniques are suitable for an online blended learning environment where students generally work independently. When a student completes filling in a

graphic organizer, one or several of the following techniques can be used to aid the student in understanding and in the construction of a knowledge base:

- Coding and cuing reminders
- Modeling and thinking aloud
- Coaching – teacher and peer
- Using visual and mnemonic cues
- Practicing reciprocal teaching
- Prompting and questioning strategies which aid chunking and sequencing (p. 1)

As described, one of the benefits of using graphic organizers as scaffolding tools includes providing the teacher with diagnostic information revealing the extent to which students understand the subject matter being presented. The diagnostic portion of the process can be accomplished by only a cursory look at the students' progress in compiling a graphic organizer or through a more in-depth inquiry into the students' understanding of the material. Only when educators know exactly what individual students comprehend thoroughly can they prescribe didactic challenges which will stretch their abilities in acquiring additional knowledge. This gentle push beyond the student's comfort zone or ability of understanding will result in the learner acquiring a fuller understanding of the subject.

To ensure that the student will not give up as he or she stretches to acquire new knowledge and understanding, the teacher or other capable students must come alongside the wavering learner to offer support and to provide a scaffold from which the learner can draw strength. This process can be repeated over and over again with the same student as the educator briefly scans or studies in depth the student's graphic organizer in an effort

to understand what the student understands completely and to identify the areas in which scaffolding is needed.

Lev Vygotsky, a Russian theorist who was deeply interested in developmental psychology, was concerned with what type of assistance facilitated learning most efficiently among students at different age levels. Through his many experiments, he discovered that students, when given the appropriate assistance during a learning task, could achieve far more than they could when tackling learning tasks on their own. He introduced the existence of a "zone of proximal development" (ZPD), which he defined as, "…the distance between a child's actual development level, as determined by independent problem solving, and the higher level of potential development as determined by problem solving under adult guidance or in collaboration with more capable peers" (Elliott et al., 2000, p. 55). Simply stated, the ZPD, as described by Vygotsky, is the difference between what a learner can do independently and what he or she is capable of doing with assistance.

According to Daugherity (2004), in any learning setting there are tasks that students are able to do alone, and there are tasks which students are able to do only with the assistance of others. The lack of ability is usually due to a lack of understanding, knowledge, and intelligence. In an online blended setting, Nathan and Barrett (2004) observe, "Scaffolding…can be provided by a range of elements in the learning process, for example, learning recourses, interactive technologies and/or other learners" (p. 87). Nathan and Barrett surmise, "Most scaffolding and support of student learning relies heavily on the constructivist principles of dialogue, such as those identified by Bruner (1966) and Vygotsky (1978), where students need to construct knowledge with more

experienced others" (p. 87).

The learner's comfort zone should be stretched by the teacher, but only in the student's ZPD. The practice of scaffolding assumes that the scaffolding will be constructed by the teacher. According to Sprenger (2005), graphic organizers "…may help you reach the students as they provide a scaffold for the learning" (p. 26). She provides a list of six specific graphic organizers along with a short explanation of how they may foster scaffolding:

- Venn diagrams help students see similarities and differences.
- Mind mapping is a helpful way to organize new material.
- Charts help students pay attention.
- Hierarchy diagrams may be useful for classification purposes.
- A t-chart, or two-column chart, can be used to organize many content areas.
- Sequencing charts are great for stories and history time frames (p. 26).

Due to the amount of reading for information in the social studies course content in both traditional and online settings, students must have the aptitude to read, learn, and comprehend at a level never before required (Graves & Avery, 1997). Regrettably, the most recent National Assessment of Educational Progress (NAEP) reports that the majority of contemporary students are not able to examine and understand historical texts (Williams, Lazer, Reese, & Carr, 1995). Continuing to comment on this phenomenon, Graves and Avery state, "…many of today's students lack the reading skills necessary to gain insights from the past, engage in critical thinking, and follow complex chains of events" (p. 135). With more high schools offering online United States History courses coupled with the difficulty many students have in analyzing and interpreting historical

passages, one can see that students' difficulty in comprehending historical data will only be exacerbated as more schools turn to online education.

Educators find themselves facilitating students who have difficulty reading for information, analyzing, and interpreting the text. These facilitators who must embrace a curriculum which relies heavily on these skills in the attainment of knowledge and information are in somewhat of a quandary. Graves and Avery (1997) have observed, "At the secondary level in particular, teachers are frequently unfamiliar with reading strategies that could help bridge the gap between the text and student understanding" (p. 6). Even though social studies teachers are not necessarily experts in the instruction of reading, they should be familiar with didactic strategies which will assist students in understanding historical information.

According to Graves and Avery (1997), many leading social studies teachers and experts in the field have been proponents of having students web ideas together through the use of a variety of graphic organizers. Graves and Avery point out that the didactic beauty of scaffolding is that it can be tailored to the specific needs of each student. Some students have less difficulty reading and understanding historical data; in these cases, scaffolding would be much less extensive. Some students struggle more with analyzing and interpreting historical text and, as a result, would need more scaffolding intervention. However, without knowing which students are struggling and which ones are sailing through without any apparent problems, the social studies facilitator in a blended learning environment will not be able to prescribe individual interventions.

In a blended learning environment, graphic organizers can serve as diagnostic tools, providing teachers with crucial cursory information needed to check for student

understanding and comprehension. Should it be discovered a student is struggling in understanding while deciphering historical literature, the teacher can take immediate steps in choosing and prescribing an appropriate scaffolding tool to assist the learner in grasping the concept. As with other pedagogical interventions, to be most effective, scaffolding should be tailored to the specific needs of individual learners (Nathan & Barrett, 2004).

Visual Representations and Graphic Organizers

Based on Jensen's (2000) research, visual learning accounts for an astonishing 80 to 90% of all the information absorbed by the human brain. He also notes that 40% of all nerve fibers connected to the brain originate in the retina. Since so much of our learning is attached to visual acuity, portraying complicated, confusing, disjointed facts and events of the United States History curriculum through pictorial graphics should foster learning. Visual organizers will aid the learner in the construction of a knowledge base and connect otherwise disjointed information, thus enabling the grasping and remerging of information. Markowitz and Jensen (1999) observe, "Imposing a physical order on information or providing a logical framework for it makes it easier to remember" (p. 179).

Fiske and Taylor have concluded (as recorded in Jensen, 2000) that neither the traditional manner of teaching, including class discussions and reading for knowledge, nor the contemporary practice of gleaning information from a computer is the most effective way to communicate new ideas and facts to students. Instead, they contend that the most effective way of conveying information is through concrete, vivid images. Fiske and Taylor base their statements on the work of neuroscientists who theorize that "…the

brain has an attentional bias for high contrast and novelty; 90 percent of the brain's input is from visual sources; and the brain has an immediate and primitive response to symbols, icons, and other simple images" (as cited by Jensen, 2000, p. 58).

Based on the findings of Fiske and Taylor and the definition of a graphic organizer according to Darch and Eaves (as cited by Ae-Hwa K. et al., 2004), graphic organizers are excellent tools to use when presenting information in a concrete and vivid manner. Darch and Eaves (as cited by Ae-Hwa K. et al., 2004) surmise, "Graphic organizers are visual and spatial displays designed to facilitate the teaching and learning of textual material through the use of lines, arrows, and a spatial arrangement that describes text content, structure, and key conceptual relationships" (p. 105). From this definition and through reviewing a copulation of similar definitions of graphic organizers, it seems that graphic organizers include one or several of the identified descriptors that the brain naturally has a propensity to respond to including symbols, icons, and other simple images described by Fiske and Taylor.

Research is replete with evidence that the brain works best when information is presented through patterns. Students can remember more if the information being learned is linked together in some fashion. Graphic organizers, which employ symbols, icons, and other visual images, help students to make the connections between new and previously learned facts, between the new facts that are being learned, and between stimuli that will be encountered in the future. They aid students in making those connections visually and physically. It has also been shown, according to Carr (2007), by aiding the visual receptors in the brain, other parts of the brain will be more fully engaged, allowing for information to move more easily from short-term memory to long-term memory.

Learning and Graphic Organizers

Teaching students how to embrace texts is an important duty that educators must embrace. Like many texts, social studies texts are often convoluted and not written in a user-friendly fashion (Beyer, 2008). Weinstein and Mayer point out (as cited in Jensen, 2000), "When learners are instructed in learning-to-learn skills, their ability to process new information can rise substantially" (p. 80). When defining what it means to be an educated person, business tycoon Peter Drucker says, "We can predict with confidence that we will redefine what it means to be an educated person…it will be somebody who has learned how to learn and who continues to learn…." (p. 80).

Again according to Jensen (2000), not only can intelligent thinking be taught, it is necessary for educators to be aware of the necessity to teach students critical thinking and problem solving skills. Skills which are learned through the use of graphic organizers are well represented among a list of techniques which Jensen (2000) believes educators must interweave into their lessons. The tactics identified will assist students in cultivating higher level thinking and problem solving expertise. Those skills, identified by Jensen, which have a direct or indirect relationship to the use of graphic organizers as didactic tools include the following:

- Gathering information and utilizing resources
- Using metaphors and models
- Conceptualizing strategies (mind-mapping, listing pros and cons, outlining)
- Dealing productively with ambiguity and novelty
- Generating possibilities and probabilities (brainstorming, applying formulas, incorporating surveys, using cause and effect)

- Using generalization and pattern detection (identifying and organizing information, translating, using cross-over applications)
- Sequencing events (p. 180)

The identified listed skills can be applied almost on a daily basis in most United States History classes because of the complexity of most historical texts (Graves & Avery, 1997). In an online blended learning environment where students most often depend heavily upon reading online text for information, teaching thinking skills has never been more important. Graves and Avery comment, “Social studies teachers often hear from their students such protestations as, ‘I really did read it—but I don’t understand it at all’” (p. 6). An absence of a strategic approach to learning is one of the most identifiable and associative characteristics found among students who tend to be struggling learners. This deficiency is not evident among students who excel in an academic learning setting (Arthaud & Goracke, 2006). An example of an empirical identified strategic approach which assists students in constructing knowledge is that of graphic organizers.

Beyer (2008) points out that educators engage students in a number of learning activities which frequently require complex mental operations or thinking skills. To illustrate his point, he lists a plethora of learning activities which students must employ when engaging in the reading and understanding of the social studies text. A partial list of those skills needed to fully understand historical text as noted by Beyer include “…reading texts, documents, and other sources; making and analyzing decisions; classifying information; analyzing to establish cause-and-effect relationships” (p. 196). After having recorded information onto graphic organizers, students employ, according to

Ellis (2004), "…in-depth discussions, prioritizations of the information, elaborations, debates, drawing conclusions, making connections to other ideas, making inferences, and extending students' understanding of important concepts, making decisions, proactive planning, and so forth" (p. 2) as higher order thinking skills.

When constructing and viewing graphic organizers, students are doing more than may meet the eye. While Ellis (2004) points out that placing bits of information in different shapes including squares, rectangles, and circles is important, what is even more important to remember is the information processing students engage in when gathering information to be placed within the different shapes and the academic process that occurs as students view and study the graphically oriented portrayal of information. Sprenger (2005) points out, "The ability to conceive that something fits into a particular category requires understanding the distinguishing features of it" (p. 68). This task includes being able to identify examples of criteria and also being able to classify the examples into specific categories. According to Anderson and associates (as cited by Sprenger, 2005), "…classifying and exemplifying are complementary….To exemplify, one begins with a general concept and leads the student to a more specific occurrence. Classifying takes the specific example and leads the student to the general concept or principle" (p. 69).

Gerald Edelman, Nobel laureate and director of the Neurosciences Institute at Rockefeller University, indicates (as cited by Carnine, 1998) that brain research tends to refute a prevailing theory held by many educators. The learning theory referred to by Edelman promotes dividing learners into separate learning domains such as tactile, visual, and auditory, based on learners' propensities to gravitate to one or the other or based on students' past success or failure within a particular domain. After a student's

strength is identified, instructional methods which foster those strengths should be prescribed for that student. “The central procedures in Edelman’s schema are categorization and re-categorization in perception, in recognition and in memory” (as cited by Carnine, 1998, p. 144). Edelman’s theory is summarized by three operations:

- How we perceive stimuli depends on how they are categorized and how they are organized in terms of other stimuli, not on their absolute structure.
- Recognition of an object requires its categorization. Therefore, categories are created by coupling, or correlating different samplings of the stimuli.
- We do not simply store images or bits but become more richly endowed with the capacity to categorize in connected ways (p. 144).

While connecting with students through their specific operant learning styles is suspect, according to Edelman (as cited by Carnine, 1998), it is embraced by other educators. Sprenger (2005) admonishes educators to vary teaching styles and learning opportunities in order to embrace a variety of learning styles. “Our students have different ways of learning. Some of them are visual learners, some auditory, and some kinesthetic or tactile. These learning preferences or learning strengths may influence what our students are paying special attention to” (p. 26). Despite theorists’ differences concerning the manner in which students acquire knowledge, graphic organizers can be utilized to foster learning no matter the learning style preferred by the student.

Graphic organizers are suitable didactic tools in assisting students in honing and focusing their perception of stimuli by creating specific segments into which new stimuli can be divided and stored. “Graphic organizers provide a framework for the learning, and they keep the students within that structure” (Sprenger, 2005). Markowitz and Jensen

(1999) comment, “Organizing information makes it more manageable for the brain by providing an immediate reference point for its retrieval” (p. 179). By organizing information into distinct and visual categories, a student is afforded a visual map which enhances one’s ability to perceive connections between related stimuli. Once the seemingly disjointed stimuli are fused together by completing and reflecting upon a graphic organizer, the student will find it less difficult to construct new knowledge.

Graphic organizers are also suitable tools to use for those who subscribe to Howard Gardner’s multiple intelligences theory (Elliott et al., 2000). Gardner identified at least seven domains in which intelligence manifests itself. Those domains included linguistic, logical-mathematical, musical, spatial, bodily-kinesthetic, intrapersonal and interpersonal manifestations of intelligences (Elliott et al., 2000). Educators who embrace this theory will find that graphic organizers provide students with an array of learning opportunities which lend themselves in facilitating learning among students who exemplify differing learning intelligences (Sprenger, 2005).

At first glance, one may think visual learners would profit the most by the use of graphic organizers, but that is not true. Through the process of discussing the material recorded on the graphic organizer, auditory learners benefit tremendously not only from the auditory but also from the organization provided (Sprenger, 2005). Kinesthetic and tactile learners also benefit from graphic organizers as they are able to manipulate them, especially if the organizers are contracted as cubes, mobiles, flip charts, pyramids, dioramas, layered books, and other objects which can be physically manipulated (Stokes, 2004).

Graphic Organizers and Secondary Academics

Graff (2005) observes, “A concept map can provide a reliable indication of how efficiently an individual has learned about the relationship between the concepts within a subject domain” (p. 411). High school students should have little or no difficulty completing graphic organizers independently if they are created on the learner’s developmental and academic level (McMackin & Witherell, 2005). Contemporary research further indicates that the brains of teenagers are especially ripe for understanding, applying, and utilizing graphic organizers due to the cognitive changes which take place in early adolescence and continue to be refined during the teenage years (Morris, 2006). Kuhn (2006) reports the following findings which are pertinent to this area, “By middle to late adolescence, the evidence suggests, teens have fewer, more selective, but stronger, more effective neuronal connections than they did as children” (p. 59).

Because of cognitive changes in teens’ brains, basic information processing is enhanced. The results of the enhancement of basic information processing skills in relation to cognitive development has a positive effect on improved speed and improved capacity in cognitive processing skills (Kuhn, 2006). Research has also indicated that graphic organizers are instrumental in aiding students in recalling, amplification, and refining their existing schemata or in the development of new schemata (Nussbaum & Schraw, 2007).

Carr (2007) lists seven specific reasons for including graphic organizers as instructional tools:

- Enhance concept development and higher order thinking
- Provide organized visual learning clues

- Enrich reading, writing, and summarizing
- Aid writing by supporting planning and revision
- Promote focused discussion
- Assist instructional planning
- Serve as assessment and evaluation tool (p.12)

According to the 2003 Institute for the Advancement in Education report, (as cited by Carr, 2007), a plethora of empirical evidence exists which supports the use of graphic organizers as instructional tools for increasing comprehension. This report reveals that 29 research studies have concluded that graphic organizers help students achieve the following skills:

- Brainstorm ideas
- Develop, organize, and communicate ideas
- See connections, patterns, and relationships
- Assess and share prior knowledge
- Develop vocabulary
- Outline for writing process activities
- Highlight important ideas
- Classify or categorize concepts, ideas, and information
- Comprehend the events in a story or a book
- Improve social interaction between students, faculty group work, and collaboration among peers
- Guide review and study
- Improve reading comprehension skills and strategies

- Facilitate recall and retention (p.12)

The Graphic Organizers and Implications for Universal Design for Learning: Curriculum Enhancement Report, which was a joint effort between the National Center on Accessing the General Curriculum (NCAC), the U.S. Department of Education, and Office of Special Education Programs (OSEP), concludes that graphic organizers have been instrumental in aiding reading comprehension within academic subjects (Strangman, Hall, & Meyer, 2003). However, as pointed out in the study, the benefits of graphic organizers broaden well beyond benefiting reading comprehension. The benefits of graphic organizers relating to social studies and other curricula as well have been especially beneficial. “Operations such as mapping cause and effect, note taking, comparing and contrasting concepts, organizing problems and solutions, and relating information to main ideas or themes can be broadly beneficial” (Strangman et al., 2003, p. 4).

Reading and Graphic Organizers

As is true in the traditional classroom setting and as in an online blended learning setting, the final goal of reading is to derive meaning from the text. In the lower grades, the focus is on learning the skills needed to read; however, Gajria, Jitendra, Sood, and Sacks (2007) point out in the latter grades the emphasis on reading shifts to “reading to learn.” Assuming that high school students have acquired the skills needed to read in the lower grades, many high school content area courses rely heavily on “reading to learn.” In the traditional setting, students read from textbooks; however, through the use of technology, many students are now being directed to computer based reading assignments.

Students are heavily dependent on their reading skills in the online setting, even more so in many cases than the traditional classroom setting, which traditionally includes lectures. Since students receive the bulk of their information in an online setting via the computer, they must rely on their reading skills to explore and gain information needed in comprehending the subject matter. The challenge facing teachers and facilitators in today's e-learning environment is assisting students in developing or enhancing their reading skills. Curran and Smith (2005) observe the most critical piece in motivating adolescents to engage in reading, regardless of the medium, is by the creation of a sense of discovery.

Building on this research relating to the ramifications of discovery as linked to adolescents and reading engagement, Curran & Smith (2005) further suggest that the road to engaging students in the reading process lies in the adventure of discovery. When students read to discover, their concentration levels increase as well as lengthen. Among the tools Curran and Smith select to foster focused concentration during the reading process is an array of graphic organizers which are introduced before, during, and after the reading assignment.

With an increase in popularity of online and blended learning environments, graphic organizers play a crucial role in assisting students in the learning process. Teachers can assist students in understanding what they read, according to Vaughn and Edmonds (2006), by "providing graphic and semantic organizers that assist students in writing or drawing relationships from text" (p. 132). If students are unable to understand what they are reading, learning will certainly be more difficult.

Burk Smith, cofounder and CEO of Smarthinking, an online tutoring firm, made

the following comment as recorded by Rivero (2005), “Using courseware, adopting electronic textbooks, and integrating digital content into the curriculum merely replicate what is already done with traditional textbooks and with traditional instruction in a digital environment” (p. 41). In addition to being difficult to read, textbooks used in most high schools are not necessarily designed to establish background knowledge of historical concepts and events (Boon et al., 2006). In addition, they do not adequately explain the relationship between concepts, thus resulting in a lack of continuity and clarity. When pictures are used, many times they do not relate well to the topic or are printed on another page, leaving the student to flip back and forth. According to Boon et al., students who use cognitive organizers to facilitate their recording and organization of social studies concepts along with the traditional textbook instructional model will increase their content-specific knowledge and comprehension.

Katayama and Crooks (2003) observe, “In many of today’s e-learning classrooms students depend upon and receive much of their knowledge from electronic text much as in the same fashion they relied on hard copies of text in the past” (p. 296). Alonso et al. (2005) surmise that, when information is presented as text only, it is more difficult for students to recall the information from long-term memory than when the text was accompanied by illustrations and knowledge organizers. Katayama and Crooks recognize, “The graphic organizers provide visual representations and organizational schema, which are useful for assisting students in organizing key concepts, vocabulary, and information from text” (p. 296).

Students’ abilities to comprehend texts, which are often poorly organized, weigh heavily on students’ academic successes. According to Crawford and Carnine (2000), the

textbook remained the predominate source of information for teachers in delivering instruction within the content areas in traditional classrooms. Interestingly enough, many teachers and students find hard copy textbooks as well as electronic textbooks unorganized, overwhelming, and difficult to comprehend. Teachers find that graphic organizers assist them in organizing, condensing, and presenting textual information in a visual and tangible manner. With a more succinct presentation of the material, students are more able to understand the content (Culbert, Flood, Windler, & Work, 1998). In addition, Bowman, Carpenter, and Rose (1998) found graphic organizers prove more beneficial for contemporary students because students are becoming more and more visual learners. This learning style is attributed to students' familiarity with computers.

Graphic organizers are superior to notes and study guides, which are linear displays of information, in fostering comprehension because they assist students in storing information in a more spatial format (Robinson et al., 2006). When graphic organizers are used, textual information is stored in memory, much like pictures, which allows for easier retrieval of the information (Katayama & Robinson, 2000). It has been suggested that students extract more information in a quick glance from a spatial display of information than they do from studying a linear display for a long period of time (Robinson & Katayama, 1998).

A vast number of strategies address reading and comprehension deficits and provide solutions. The use of graphic organizers is one such identified strategy which provides techniques for improving reading and comprehension skills. Recent studies indicated that graphic organizers have a positive effect on reading and vocabulary comprehension skills (Bowman et al., 1998). Brookbank, Grover, Kullberg, and Strawser,

(1999) surmise that the use of graphic organizers aids students in reading comprehension in that they give students the ability to make connections, remember important facts and concepts, and attain higher level thinking and reasoning skills.

When students comprehend more fully what they are reading and are able to make connections to what they already know, their understanding of the material will invariably increase. The literature indicates that students who utilize graphic organizers while reading and learning social studies material are likely to understand and embrace the material in a more positive fashion than students who are not afforded graphic organizers (Katayama & Steven, 2003). The students will be able to grasp more information as they are empowered by the organizers. These tools will enable students to perceive how events in history are related to each other and how certain actions cause and effect other reactions. Students will have the opportunity to organize and present otherwise difficult concepts to their peers through the use of graphic organizers (Bowman et al., 1998).

Social Studies and Graphic Organizers

Governale (1997) found that many students find social studies boring and wasting time. Carroll and Leander (2001) found that many students are frustrated, distracted, and bored because of the lack of learning strategies and with the meaningless reading assignments often associated with social studies. Student achievement in many subject areas is closely related to reading comprehension and vocabulary skills. This finding holds especially true for social studies; hence, much information is obtained through reading and comprehension. Brookbank et al. (1999) concluded that student underachievement can often be attributed to poor reading and comprehension skills.

Many students become disheartened and frustrated because they lack the ability to comprehend social studies reading material.

The use of graphic organizers as a means of increasing student comprehension, aiding in recalling previously stored information from memory, and having an overall positive effect on students' attitudes toward social studies is supported in literature. With much of the present day instruction requiring students to have at least grade level reading skills, research has shown that graphic organizers facilitate readers by enabling them in connecting main ideas and recalling important facts, thus improving reading and understanding.

Gallavan and Kotter (2007) have observed through their research, "Many teachers are concerned that social studies overwhelms their students; often, students view social studies as a complex and confusing subject unrelated to their contemporary world" (p. 117). Social studies students especially benefit from graphic organizers, according to Gallavan and Kotter, because "Graphic organizers or concept maps … help students sort, simplify, show relationships, make meaning, and manage data quickly and easily" (p. 117). Also, Gallavan and Kotter comment, "Graphic organizers can make learning social studies terminology, structures, and functions manageable and memorable" (p. 118).

Boon et al. (2006) suggest, based on the results of their study, using computerized generated graphic organizers has "…the potential to increase significantly content-area learning and achievement in inclusive social studies classrooms for students with and without learning abilities" (p. 211). Communicating ideas and concepts, which are to be mastered with others, increases both long-term and short-term memory. In addition to aiding the learner in laying a foundation or schema, it will serve in making sense of

information which will be encountered through subsequent journeys, as is especially true in United States History, which is designed in a hierarchal sequence.

Governale (1997) suggests that students will become more interested in social studies when graphic organizers are used before, during, and after the lesson. The organizer will allow the students to compare and contrast individuals, groups, and events. These comparisons will aid the children in making sense of the past and also help them in putting the pieces of the historical puzzle together (McCoy & Ketterlin-Geller, 2004). Carroll and Leander (2001) surmise that when students are able to comprehend and understand what they will be learning, their frustration levels will decrease and their motivation levels will increase.

Graphic Organizers and Biblical Pedagogies

Jesus extensively weaved parables into his teaching methods throughout his earthly ministry. Matthew states, “Jesus always used stories and illustrations like these when speaking to the crowds. In fact, he never spoke to them without using such parables” (Matthew 13:34). Many of the hearers of Jesus’ teachings were commoners lacking the knowledge to understand the precepts espoused by Jesus during his earthly ministry. Therefore, Jesus often taught by asking his hearers to consider a parable, which was a common teaching tool (Butt, 2000).

As defined by Dictionary.com (n.d.), the term *parable* means “(1) a short allegorical story designed to illustrate or teach some truth, religious principle, or moral lesson. (2) a statement or comment that conveys a meaning indirectly by the use of comparison, analogy, or the like” (¶ 4). Based on this definition, there are three similarities noted that are strikingly parallel to the pedagogical usefulness of graphic

organizers. The similarities found among these didactic tools include their usefulness in conveying meaning, aiding understanding, and connecting prior knowledge.

Just as parables are used to convey the meaning of otherwise difficult to comprehend concepts, graphic organizers are used to assist students' comprehension. When graphic organizers are employed, seemingly difficult to comprehend information becomes much more manageable as students decipher the meaning of the information through the lens of a graphic organizer. Graphic organizers are useful in assisting students in understanding text that would otherwise be difficult to comprehend because of student inability to connect logically or make sense of the information (McMackin & Witherell, 2005).

Similarly, parables assist learners in understanding. Smith King and Harrison (2000) point to the instructional importance of parables in that they assist students in "reading between the lines," which is a decoding device used by good readers in understanding otherwise difficult reading assignments. The hearers of the parables are enabled to read between the lines based on their familiarity with the subject being spoken and schemas used to process the meaning of the parable. Hoy and Miskel (2008) record, "Schemas are organized systems of action or thought that allow us to mentally represent or 'think about' the objects and events in our world" (p. 69). Therefore, when hearing a parable flushed with images from stories spoken by Jesus, His students were able to visualize and organize the concepts in their brain. A similar process occurs when students take information from a text or even spoken word and pin it to a graphic organizer and then view the organizer as a complete unit of information.

Comparing new knowledge with prior knowledge is yet another facet graphic

organizers and parables have in common. Concerning the meaning of the term *parable*, Graves and Graves (1995) state, "Literally the word *parabole* means a placing alongside of. It places a story alongside a spiritual truth in hopes of shedding light on its meaning. Some have defined it as an earthly story with a Heavenly meaning" (p. 1). Butt (2000) adds that the word *parable* also has the connotation of being parallel. Interestingly, Smith King and Harrison (2000) remind their readers that the term *parable* has its roots in the mathematical parabola. A parabola is "that curious shape which is mirrored around an axis" (p. 3). Biblical concepts were sometimes difficult for Jesus' students to comprehend; however, when compared and contrasted with or laid alongside of a concept, which most had common knowledge of, his followers were able to grasp the meaning of the lesson. These parables made it so clear that understanding which was once opaque became translucent and that which was translucent ultimately became transparent.

In addition, learning or teaching new concepts via instructional techniques which are intended to make the learning task easier is common to both graphic organizers and parables. Both capitalize and build upon one's prior knowledge. Parables tend to focus on that which is commonly known to all within a particular group or culture (Van Der Zee, Hermans, & Aarnoutse, 2006). By conjuring up prior knowledge and relating it to new ideas and concepts in a clear and concise manner, parables aid in unraveling otherwise hidden meanings and difficult to comprehend precepts, thus facilitating the learning experience (Van Der Zee et al., 2006).

While parables are not visual graphic representations of ideas, precepts, or lessons that are to be learned, they are mediums for constructing and cultivating mental

portrayals and images which serve as a catalyst for creating and conveying meaning of otherwise difficult to comprehend precepts (Van Der Zee et al., 2006). Once the mental images are formed in the brain, they will connect themselves to the learner's prior knowledge as guided by the subject of the parable, resulting in newly blended knowledge or concepts as the learner constructs meaning from the parable (Smith King & Harrison, 2000).

Although not literally graphic, parables produce similes which are derived from one's previously established knowledge or images of ordinary daily events, occupations, and natural occurrences (Graves & Graves, 1995). This phenomenon of having the capacity to organize information in the brain in a relational manner is a fundamental aspect of human intelligence. Gick and Holyoak's study (as cited in Hummel & Holyoak, 2005) found, "Relational thinking involves the ability to see analogies between superficial disparate situations and to form general schemas, or relationally defined concepts" (p. 153). Van Der Zee et al. (2006), state that a parable evokes "…a particular discourse of images in which the story is narrated and invites readers to enter the fictional world" (p. 5). However, the world which they enter produces new knowledge in the real world of learning.

The literature further suggests that comprehension is increased when previously acquired knowledge is linked with newly learned information. This linkage is due to being able to retrieve more readily from memory information which has been stored in a spatial manner. Students are able to recall previously learned concepts that have been stored in memory in a pictorial manner more easily than recalling information that has been stored in a non-spatial manner, thus resulting in greater comprehension (Carr,

2007).

Conclusion

There is little published data regarding the effectiveness of online and blended learning when employed with high school students. There is an abundance of information and research regarding the achievement of college students enrolled strictly in online courses; however, college students make up a somewhat different demographic than their counterparts who still remain in high school. That is not to say that the same instructional strategies and pedagogies, which have proven to be effective with college online students, would not profit high school students in similar situations; however, colleges, for the most part, lag behind secondary education in adventuring into the blended learning environment.

While research on e-learning at the college level is extensive as related to distance learning, that does not hold true for the phenomenon of blended learning even at the collegiate level. Therefore, this study is on the precipice of research in determining the use of appropriate strategies, most specifically graphic organizers on the academic achievement of high school students enrolled in a non-traditional blended learning environment. According to Gobet (2005), although there has been significant enlightenment in our understanding of instruction and learning during the past century, there remains a vast domain of undiscovered knowledge even in this present age. Included among the treasures identified by Gobet that will most likely tender a potential trove of resources to aid in the instruction and learning experience are the treasures that remain to be discovered and bridled as a result of the advancements in technology.

Some educators may have a tendency to view these new technologies as the

answer to all of education's ills and a way for creating a utopian educational setting where all students succeed. However, as has been the experience of educators through the ages and remains the reality today, there is no one program or tool that will meet all of our students' needs. Rivero (2005) cautions educators not to overemphasize the panacea online education brings to the educational community. She states, "So often we think e-learning is some wonderful bullet. It's not. It's a wonderful tool that requires the right kind of cognitive and emotional support for students" (Rivero, 2005, p. 40).

CHAPTER III: RESEARCH METHODOLOGY

The intent of this quantitative study was to measure the effect graphic organizers have on the academic achievement of high school students enrolled in a United States History course in a non-traditional setting receiving curriculum in an online blended learning environment. This chapter will focus on the setting in which the research was conducted, the participants, the instrument and the procedures used to collect data, and the manner in which the data was analyzed.

Research Setting

This research project was conducted at a Performance Learning Center (PLC), which offers a non-traditional setting for students who are struggling academically in the traditional high school setting. The school opened and received students for the first time in 2006 as a joint project between the State of Georgia, the county, and Communities in Schools (CIS) of Georgia. CIS of Georgia provided a $100,000 grant to be used for fiscal and technological improvements, including restoration of a vacant physical plant, 75 computers, computer tables and chairs, and cabling to connect the computers to a high-speed server, which was also provided in the grant. As found on their web site, the CIS of Georgia received a $6.3 million dollar grant from the Bill and Melinda Gates Foundation to expand and open new Performance Learning Centers (PLC's) across Georgia. A portion of this grant was used in funding the PLC.

According to the CIS manual (2006), these centers offer a non-traditional learning environment for high school students who are not succeeding in traditional high schools. While plausible reasons for the students' deficient academic performance varies, based

on their historical academic success along with norm-referenced and criterion-referenced testing results, they have the aptitude to succeed academically. While it is difficult to determine why all are not doing well in the traditional high school environment, several factors have been identified by the students themselves, their teachers, and counselors. Identifiable factors for poor achievement range from a student's lack of concern, unfortunate home environments including the lack of material goods and/or family support, personal issues including student pregnancies and personal relationships, and an inability to focus in a large class of students. This litany of probable factors is not comprehensive and would include other issues that would negatively affect a high school student's academic success.

PLC's create business-like learning environments where students are challenged and supported to meet their social and academic goals in a small academic setting. Students complete coursework using an online, computer-based curriculum in concert with project-based learning. This online curriculum has hyperlinks throughout the entirety of the course that enrich the lessons through adding interactive maps, interactive historical lessons, video clips, and an array of WebQuests. Twenty-five percent of the learners' final grade comes from scores on their class projects. For these projects students are instructed either to complete or create a WebQuest that is linked to United States History. Each module within the syllabi includes assignments requiring students to take quizzes and play academic games on USATestPrep, an online program that prepares students to pass mandatory state tests. Students email their results to the facilitator. Teachers, who act as learning facilitators, assist students with their lessons and activities, thus creating a blended learning environment.

The PLC in this project is served by a total of seven personnel, including an academic coordinator, an administrative assistant, and five facilitators. To provide instruction at the high school level, it is required that each facilitator be highly qualified in the subject area he or she is responsible for teaching or facilitating. Those specific subject areas include science, social studies, language arts, math, and electives.

Each facilitator is responsible for providing students with their course syllabi, pacing guides, guidance, and academic assistance. Students are placed in small classes with facilitators according to the subject area to which they are assigned. For example, those assigned to a social studies-related subject, including United States History, Civics, World History, World Geography, Economics, and Current Events, are assigned to the social studies facilitator's classroom. Throughout the class period, the social studies facilitator is available to offer clarification and explanation to students as needed. The facilitator also provides small group instruction in order to introduce, offer explanations, or review segments of the curriculum.

Since the social studies classroom houses 15 computers, no more than 15 students are assigned to a facilitator at any given time per class period. Students change classes three times per day with the length of each class being approximately two hours each. Therefore, because of the scheduling configuration, the social studies facilitator never has over 45 students in total assigned to his three classes during the academic school years in which the study was conducted. However, at no one time were all students assigned to a social studies-related subject area assigned in the Untied States History course. Due to the six distinct domains within the social studies curriculum being offered concurrently at the PLC, the population of each class session consisted of an amalgamation of students

enrolled in different subject areas within the total social studies curriculum.

Students seldom completed identical lessons within the same time frame, even when enrolled in the same subject in the same classroom, due to scheduling arrangement combined with students working independently at their own pace. The study, therefore, covered the span of two academic school years. This duration of time was needed in order to include an adequate number of students in making a legitimate comparison of the effect of the independent variable, graphic organizers, and the dependent variable, academic success as measured by a United States History End-of-Course Test (EOCT). During the 2006-2007 academic school year, a total of 43 students were enrolled and completed the United States History Course. A total of 35 students completed the same United States History class during the 2007-2008 academic school year.

Research Participants

High school students or those persons of high-school age during the 2006-2007 and 2007-2008 academic school years were qualified to apply for admission to the PLC. However, admission was contingent upon three criteria which included completing the application process, taking and passing an entrance exam, and interviewing successfully. After submitting an application for entrance into the school, students were given an appointment to take the Basic Achievement Skills Inventory (BASI) test. A score of 8.0 or higher in reading and math was required to continue the application process. However, students scoring 6.5 or above in the two identified core areas were eligible to be considered, albeit with much discretion.

The BASI series includes multi-level, norm-referenced achievement tests which measure math, reading, and language skills, according to the Pearson website ("Basi,"

2008). Two versions of the BASI are generally offered including a comprehensive version and a survey version. The survey version, which was administered to students at the PLC, not unlike the comprehensive version, is also a standardized norm-referenced test which was created to measure students' academic strengths and weaknesses in four grade-specific levels. Applicants were administered the level three survey version which is designed to test grades seven through eight according to the PLC's Manual (2006). Historically, it has been substantiated that students who perform below the middle school level in math and reading typically struggle in meeting the academic rigor prescribed for students attending PLC's.

If a potential candidate did not obtain the required score for acceptance into the program upon taking the entrance test, he or she could reschedule a testing date to be given the test again. If on the second attempt, the student scored high enough to be considered eligible for admission, he or she would then proceed along the same track as described above.

Subsequently, applicants were required to participate in an interview hosted by the academic administrator along with two other school personnel, one of which was required to be a facilitator at the center. The student's parents and/or legal guardians were also required to accompany the student to the interview as well as agree to and sign a PLC contract, which included the rules and requirements of the school before being further considered for admittance into the program. The admission contract included the rights and responsibilities of the student, parents and/or legal guardians, as well as the PLC facilitator's.

Research Instrument

Choosing the most appropriate testing instrument to be used in the study among students receiving instruction in a non-traditional setting was crucial. Utilizing an online curriculum in a blended environment was significant because its results adequately measured students' academic achievement. In keeping with the No Child Left Behind Act, which mandates that each state establish academic standards for courses taught and, in addition, create testing instruments to measure those standards, the state of Georgia has created standards for United States History as well as the testing instrument to measure student academic progress as compared to those standards (Cox, 2008).

Based on this legislation, the Georgia Department of Education requires that each student in eight specific academic core areas be administered an EOCT. The Georgia State Legislature mandated the creation and implementation of EOCT in 2000. According to the Georgia Department of Education, the A+ Education Reform Act of 2000 mandated that the State Board of Education establish and adopt an EOCT for core high school subjects. The subjects in which students are mandated to take the EOCT include math, science, language arts, and United States History (Cox, 2008). Cox, Georgia's State Superintendent of Schools, explains the EOCT has two purposes: "to insure all Georgia students have access to a rigorous curriculum that meets high expectations and to provide information to improve student achievement through effective instruction of the standards in the state-adopted curriculum" (p. 1).

According to the Georgia Department of Education (2008), initially, the EOCT was based on the curriculum developed by the Georgia Department of Education, which was referred to as the Quality Core Curriculum (QCC). However, in 2002, it was determined that the QCC was much too broad in scope to measure adequately student

progress, not to mention that it was never correlated with national educational standards according to the Georgia Department of Education's website. In lieu of these limitations with the QCC, the Georgia Performance Standards (GPS) were adopted by the Georgia State Board of Education in 2004. Once the standards were adopted, Georgia educators began the work of developing the United States History EOCT based on the GPS instead of the QCC standards.

The GPS standards can be accessed online at the Georgia Department of Education's web site by both teachers and students. There are 25 United States History standards for which students are accountable and are subsequently tested on the United States History EOCT. Each standard has a number of qualifiers indicating specific areas of concentration, which are considered part of the more generally stated standard. These qualifiers delineate the broader standard by elaborating on specific information students must master in order to have adequate knowledge of the standards encompassed on the EOCT. These qualifiers, therefore, allow for a more comprehensive preparation for teachers and students alike.

According to the GPS phase in scheduling during the 2006-2007 school year, United States History instructors were to be trained in the implementation of the new standards. However, the 2006-2007 EOCT would reflect GPS as well as correlated QCC standards. The fully revised test, based entirely on the GPS, was not scheduled to be given until the winter session of the 2007-2008 school year, according to the Georgia Department of Education (2008).

In actuality, the United States History curriculum developed for the PLC was based upon the GPS from its inception beginning the 2006-2007 school year. United

States History GPS were available to Georgia educators as early as the 2005-2006 school year. The PLC curriculum was also developed giving attention to the content descriptors found for United States History on the Georgia Department of Education's web site, which linked GPS with QCC standards. The practice of consulting the content descriptors continued throughout the 2007-2008 school year during the transition to the new standards. Therefore, based on these curriculum design procedures, the United States History curriculum developed and prescribed at the PLC met both the GPS and the QCC standards since the inception of the center in 2006.

Unlike a norm-referenced test which compares an individual student's knowledge with that of all others taking the test, the United States History EOCT is a Criterion Referenced test. Criterion Referenced tests are derived from the criteria taught as prescribed by an educational entity; therefore, the student's results are a reflection or measure of how well the student mastered the material prescribed (Wortham, 2001). In order to test the scope or range of a student's understanding of United States History, the EOCT does not merely focus on determining if a student has learned the content. The test also encompasses measurement for each student's understanding of the presented curriculum. To this end, according to the Georgia Department of Education, it is necessary for each EOCT to include an array of test items with some focusing on minimal or basic understanding while others challenge students with higher-level questions (Cox, 2008). Criterion referenced tests are generally seen as a more appropriate way in which to measure student achievement in a particular domain as opposed to norm-referenced testing (Wortham, 2001).

The validity and reliability of the EOCT began with the creation of the test and

continued throughout the process of developing the instrument until the test was ready to be given to Georgia students (Cox, 2008). The reliability of the EOCT was determined by measuring the internal consistency of the test referred to as the coefficient alpha. To ensure that tests were reliable and valid, the State of Georgia required the coefficients to be at or above 0.70, a score which indicates a minimally reliable test.

The validity and reliability of the 2004 spring administration United States History EOCT, given as both the pretest and the posttest, was similar in construction and content to the EOCT given through the winter session of the 2006-2007 school year. The test's validity was established through a very slow and deliberate test development process. For the United States History EOCT, a measure of internal consistency referred to as the coefficient alpha (α) was used for estimating the reliability of the tests. In the 2004 spring administration, 68,871 tests were administered to Georgia students with a determined reliability coefficient of .92 (Davis, 2008). The 2004 spring administration United States History EOCT Form 501 was the selected testing instrument for both the pretest and posttest for the experimental group, Group I, and the control group, Group II.

Procedures Used in Collecting Data

Initially, permission to conduct the study was obtained from the local superintendent of schools. After receiving permission from the superintendent of schools, the researcher also obtained permission to conduct the study from the academic coordinator of the PLC. Soon after permission was obtained to conduct the study, it was evident that it would be impossible to obtain a sufficient population or adequate sampling of students needed to consummate a research project using the 2004 spring EOCT Form 501during the 2007-2008 school year due to the limited number of students included in

the population for the 2007-2008 academic year. It was imperative the research project be conducted before the end of the 2007-2008 academic year in order that the 2004 spring United States History EOCT Form 501 could be implemented as the pretest and posttest instrument. Using data from future years would invalidate Form 501 caused by the full implementation of the GPS after the 2007-2008 school year. Based on this knowledge, the researcher moved to petition the Institutional Review Board (IRB) to allow the previous year's data to be considered as part of the study and also to exempt the researcher from obtaining parental permission to conduct the study.

The petition was founded in the researcher's belief that the research project for both the 2006-2007 and the 2007-2008 school years met the waiver guidelines for informed consent. Concerning the 2007-2008 school term, the identities of the participants selected to participate in the study were to be protected by recording their scores using a numerical coding system; therefore, it would have been impossible to identify the students, either directly or indirectly, during such time as the study was in progress or at any time in the future.

Furthermore, parental permission forms could have actually increased the ability to identify the students involved in the study as the students themselves would be cognizant of their inclusion in the research project. If the students had been informed of the particulars of the study, the knowledge of the study alone could have increased the probability of the Hawthorne Effect on the participants, thus skewing the results. The Hawthorne Effect, according to Merrett (2006), is commonly referred to by researchers "…to account for unexpected outcomes which are believed to depend on the fact that the subjects in study have been aware that they are part of an experiment and are receiving

extra attention as a result" (p. 143). In addition, the same pretest and posttest, used for the study had been included as the course pretest and posttest in the syllabus since the conception of the course in 2006. Lastly, the integration of graphic organizers into the curriculum was a normal and regularly employed educational practice and in no way would cause harm to the participants.

Regarding the previous year's collection of data, the pretest and posttest information collected during the 2006-2007 school year was transferred to a recording log using a numerical system for identification purposes in order to ensure student anonymity. The original data, logged on a single recording sheet including students' names, was not at any time out of the researcher's possession, photocopied, or duplicated in any manner. It was utilized for the researcher's knowledge only, in addition to providing general averaged reports to the academic coordinator as to the progress of students enrolled in the United States History course. The original data sheet, including students' names and scores, was shredded when the information was transferred to the new data sheet with student names omitted. To further ensure complete anonymity, student scores were randomly transferred to the new recording form. Also, all sensitive student academic information was stored securely along with other student data in a locked filing cabinet in the researcher's classroom.

The IRB was in agreement with the researcher's assessment of the miniscule degree in which the collection of data during the 2006-2007 and 2007-2008 academic school years altered or interfered with the normal curriculum delivery practices followed by the researcher. Therefore, the IRB granted his request of forgoing parental permission in commencing the study. Based on the decision of the IRB, the researcher was at liberty

to include both EOCT data from the 2006-2007 and the 2007-2008 academic school years, thus doubling the number of students in the indentified population and bringing the number of participants to 78, a tolerable number for a reliable study.

Because of the limitations placed upon the researcher in selecting students for the research project, the convenience sampling method was employed in selecting the subjects as the researcher had access only to those students assigned to his classes by the academic coordinator. The population for this study was limited to a total of 78 students, which composed the total student population in the researcher's United States History classes during the 2006-2007 and the 2007-2008 academic school years.

Because of the permission granted by the IRB, which allowed for including additional students in the study, it was possible to identify as well as assign students to two intact groups. Those students who were enrolled in the United States History course during the 2006-2007 school year received instruction in a blended learning environment which included both online and in-class assistance. Similarly, those students enrolled in the United States History course during the 2007-2008 academic school year received the exact instruction, course syllabi, and pacing chart as did those who were enrolled in the United States History course during the 2006-2007 school year. The only difference being that graphic organizers were made part of every lesson for those students enrolled in the United States History course during the 2007-2008 school year.

Group I, those who received instruction in the blended learning setting with the augmentation of graphic organizers, were referred to as the treatment group while Group II, those who received instruction without graphic organizers, were referred to as the control group. From the available population, a sample comprised of 30 students was

identified as meeting the criteria for Group I, otherwise known as the treatment group. Therefore, it was essential that the same number of students be included in Group II, the control group. The first 30 students enrolled in the 2006-2007 United States History courses were included in Group II to which Group I, those students enrolled in the 2007-2008 United States History course, would be compared. The total population from which both samples were selected was comprised of 78 students.

When permission was granted for the study to begin by the IRB, the experiment commenced in earnest. The control group, Group II, had already received instruction in United States History and had been given a pretest and posttest. However, the independent variable or treatment, the augmentation of graphic organizers into the curriculum, had not been administered.

Based on the permission granted by the school superintendent and the academic coordinator, the procedures, which constituted the employing of the independent variable, graphic organizers, were merely an augmentation of otherwise commonly, employed pedagogical utensils. This study does not fit the description of an ex post facto study as described by Gay and Airasian (2000): "…both the effect and alleged cause have already occurred and must be studied in retrospect" (p. 349). When the researcher requested permission from the IRB to conduct the study, the cause or independent variable had not been administered; therefore, the effect or dependent variable was non-existent.

The non-randomized control group, pretest-posttest design was employed; therefore, students were assigned as an intact group for treatment. Both groups were administered a United States History EOCT at the beginning of the course as was directed in the course syllabus. The tests which were administered before instruction

began were referred to as the pretest. When the course was completed, participants were administered the same United States History EOCT as was given before the class began; the second administration constituted the posttest. Again, both groups received identical pretests and posttests as they were included among the requirements in the course syllabus from the conception of the course.

Data Analysis

The quasi-experimental design was put into practice in carrying out this research project. The study followed the non-randomized control group, pretest-posttest design, which allows for assigning intact groups to treatment. Each group was given a pretest, administered a course, and then given a posttest. After the pretest was administered to both Groups I and II, a two-tailed t-test was used to determine whether the means of the two pretests were significantly different at a probability level of 0.05. There was a possibility for each student in each group to score 100 on the pretest and posttest. Therefore, the mean of both tests was out of a 100.

Statistical software was utilized in order to conduct a t-test for independent samples. This test was useful as its results were used in indicating a p-value and degrees of freedom. The researcher was able to determine if a significant difference existed between the pretest means of Group I and Group II. If a significant difference existed between the pretest means, an ANCOVA would have been used in comparing Group I and Group II. However, a significant difference did not exist based on the statistical calculations between the pretest means of Group I and Group II. Therefore, an ANCOVA was not required in this study.

After the posttest was administered to both Groups I and II, a two-tailed t-test was

used to determine whether means of the two posttests were significantly different at a probability level of 0.05. Statistical software was again used to calculate the statistics. The statistical analysis of data will be presented in a narrative form augmented with tables allowing for summarizing of the information in a conceptual manner in Chapter Five.

CHAPTER IV: RESULTS

As stated in Chapter One, this study examined the pretest and posttest results of two groups of students enrolled in United States History at the Performance Learning Center (PLC). More specifically, the data was collected and analyzed in order to determine what academic effect, if any, there would be for high school students receiving instruction in an online blended environment when augmenting their United States History curriculum with graphic organizers. Consequently, the organization of this chapter will be guided by the research question posed in Chapter One, by the design, and by procedures used in collecting the essential data required to test the hypothesis.

Selecting the Population

As posed in Chapter One, the guiding question for this research states: What effect will the use of graphic organizers have on the academic achievement of high school students using an online blended computer-based curriculum in United States History, as measured by a United States History End-of-Course Test (EOCT), pretest, and posttest? This question emerged and was ultimately chosen based on the researcher's teaching experiences with students receiving their United States History curriculum online in a classroom setting where the teacher was merely a facilitator. Being cognizant of the utility and value of graphic organizers as instructional tools, the researcher sought to discover their instructional value on academic progress in a blended learning environment. To this end, the researcher selected the sample, the most appropriate measuring instrument, design and procedures that would afford him the data necessary to test the hypothesis.

The quasi-experimental design was put into practice in carrying out this research project due to the fact that entire classes for an academic year were assigned to treatment instead of assigning individuals to treatment on an alternating basis. Also, as determined by the size of the group available for treatment, the researcher employed the convenience sampling technique in selecting subjects for the study. Also, the nonrandomized control group, pretest-posttest design was implemented, which provides for assigning intact groups to treatment and allows for giving each a pretest and posttest. The two groups assigned to this study consisted of 30 students each from the researcher's United States History classes.

Group I, the treatment group, consisted of 30 students enrolled in the instructor's United States History course during the 2007-2008 school year. Group II, the control group, consisted of 30 students enrolled in the instructor's United States History course during the 2006-2007 school year. The control group and treatment group received the same instruction except that the addition of graphic organizers was omitted from the control group's lessons and assignments.

Before instruction began, both groups were administered a pretest. When instruction was completed, each student was administered a posttest. A United States History EOCT was administered constituting the testing instrument for both the pretest and posttest. The data collected as a result of the sample chosen, design employed, procedures instituted, and measurements analyzed determined if the null hypothesis was either supported or not supported within the context of this study.

Because of the small population of students available to be included in this study of the researcher's United States History classes during the 2006-2007 and 2007-2008

school years, students were chosen according to the convenience sampling method. Although the researcher was not in command of what students would be assigned to his classes throughout the length of the study, the statistical results derived from the pretest for both the control group and the treatment group were not significantly different. The results indicated a strong similarity between the two chosen groups of students concerning their prior knowledge of United States History as measured by the released 2004 United States History EOCT. Therefore, the researcher continued with the assurance that both the control and treatment groups were statistically the same when comparing their United States History knowledge.

Administering Statistical Analysis

The researcher administered the pretest to both Group I and Group II; their means were compared using a two–tailed t-test of significance. This test was used to determine the statistical difference in the means of Group I and Group II. Because the researcher was not willing to predict if the differences between the groups would be neutral, positive, or negative, a two-tailed test of significance was chosen.

Using SPSS 14.0 Student Version ("SPSS," 14), the investigator conducted a t-test for independent samples. The results of the t-test indicated a p-value of 0.81 and degrees of freedom of 58 as relating to the pretest. A standard deviation of 7.89 and 7.01 was reported for Group I and Group II respectively. Because the p-value at 0.81 was not equal to or less than the alpha at 0.05, a significant difference did not exist between the pretest means of Group I and Group II. The pretest and posttest administered in this study had a scoring scale from zero to one-hundred. Therefore, their means were based on a numerical score out of a hundred possible points.

Because a significant difference did not exist based on the statistical calculations between the pretest means of Group I and Group II, an analysis of covariance (ANCOVA) was not required. Statistical calculations are reported in Table I (See Table I, p.87). Both groups were statistically similar in their knowledge of United States History before any instruction was given. Therefore, the researcher continued the study with confidence that the analysis at the conclusion of treatment would be a true reflection of the effect of the independent variable, assuming all other extraneous variables would be controlled as determined by the design and procedures instituted within the study.

As with the pretest, a two-tailed t-test was used in comparing the means of the posttest for Group I and Group II. The SPSS 14.0 Student Version ("SPSS," 14) was used to calculate the statistics. The t-test for independent samples was used to calculate a p-value of 0.08 and degrees of freedom of 58. The resulting p-value with an alpha at 0.05 with 58 degrees of freedom was not equal to or less than the alpha. Therefore, a significant difference did not exist between the posttest means of Group I and Group II.

A standard deviation of 7.25 and 8.49 was reported for Group I and Group II respectively. The analysis of the data as revealed indicates that the null hypothesis was supported. A significant difference between the academic achievements of those students who used graphic organizers in concert with their online blended instruction as opposed to those students who did not use graphic organizers in the same academic setting did not exist within the confines of this study. Those who had access to graphic organizers throughout the entirety of their course scored statistically similar on the United States History EOCT as those who were not granted the use of graphic organizers at any time during the course of their study. Table II represents these results (See Table II, p. 88).

According to the findings of this study, there was not a significant difference in the scores of those receiving instruction using graphic organizers and those receiving instruction without the use of graphic organizers. Current theories and research on the effect of graphic organizers on academic achievement generally support their use. While the effects of graphic organizers may vary from student to student, research indicates that their use helps in improving cognitive skills. The use or lack of use of strategies to help students improve their cognitive development has been a major focus of educational research and has important implications for teachers.

Table I

Computed Results for Independent Samples

Pretest

Statistic	Value
Number of Scores in Group I	30
Sum of Scores in Group I	1044.00
Mean of Group I	34.80
Standard Deviation	7.89
Standard Error Mean	1.44
Number of Scores in Group II	30
Sum of Scores in Group II	1029.00
Mean of Group II	34.30
Standard Deviation	7.01
Standard Error Mean	1.28
Mean Difference	0.47
Standard Error Difference	1.93
t-Value	0.24
p-Value	0.81
Degrees of Freedom	58

Table II

Computed Results for Independent Samples

Posttest

Statistic	Value
Number of Scores in Group I	30
Sum of Scores in Group I	1417.00
Mean of Group I	47.23
Standard Deviation	7.25
Standard Error Mean	1.32
Number of Scores in Group II	30
Sum of Scores in Group II	1307.00
Mean of Group II	43.57
Standard Deviation	8.49
Standard Error Mean	1.55
Mean Difference	3.67
Standard Error Difference	2.04
t-Value	1.79
p-Value	0.08
Degrees of Freedom	5

CHAPTER V: DISCUSSION OF THE RESULTS

For the readers' benefit, this final chapter of the dissertation will encapsulate the research problem and will review the foremost methods used in the study. A summary of the results and their implications will also be presented in this chapter.

Statement of the Problem

The purpose of this study was to investigate the effect of graphic organizers on the academic achievement of high school United States History students using an online computer-based curriculum in a blended learning environment as measured by a United States History End-of-Course Test pretest and posttest.

Review of Methodology

As was enumerated upon in Chapter three, this research project sought to determine what effect graphic organizers would have on the academic achievement of high school students enrolled in a United States History class receiving instruction via an online curriculum in a blended learning environment. The research project was conducted at a Performance Learning Center (PLC), which is a non–traditional high school established for students who were struggling in the traditional high school environment. The total population of the school consisted of only 75 students, which was quite small when compared to the population of the average public high school. The majority of the students enrolled in the school were referred by counselors from the rural county's only high school. However, some students took the initiative to apply for admission on their own. Admission was subject to three criteria: completing the application process, passing an entrance exam, and submitting to an interview.

Because of the limited population from which the research sample was taken, the research project included students enrolled in the PLC for two consecutive years. The study was conducted during the 2006-2007 and 2007-2008 academic school years. The researcher chose the convenience sampling method due to the limited number of students available for the study and the manner in which students were assigned to the United States History classes. The population of the study consisted of a total of 60 students enrolled in the researcher's United States History classes during the two academic school years indicated. Two groups consisting of 30 students each were chosen as the treatment and control groups.

Group I was referred to as the treatment group and consisted of 30 students who were enrolled in the facilitator's United States History course during the 2007-2008 academic school year. The control group was referred to as Group II and consisted of 30 students which were enrolled in the facilitator's United States History class during the 2006-2007 academic school year. Both the control group and the treatment group received instruction in Unites States History according to the course outline in the students' pacing charts and according to the course syllabi, with the only variable being the treatment group received instruction which was augmented with graphic organizers.

Throughout the entirety of the course, the curriculum the students were assigned in both Group I and Group II had many hyperlinks that enriched the lessons by including interactive maps, interactive historical lessons, video clips, and an array of WebQuests. Twenty-five percent of the students' final grade came from grades on their projects. For their projects students were told either to complete or create a WebQuest that was associated with United States History. Each module within the syllabi included

coursework requiring students utilize the educational games and tests offered by USATestPrep, an online program that prepares students to pass mandatory state tests. Students emailed their results to the facilitator.

The quasi-experimental design was adhered to in conducting the research. In addition, the non-randomized control group, pretest and posttest design was employed due to the manner in which intact groups were assigned to treatment. The participants in both the control group and treatment group were given a pretest prior to instruction and a posttest following instruction. The pretest and posttest given was a 2004 United States History EOCT used by the Georgia Department of Education. The means of the pretest and posttest were compared by way of a two-tailed test of significance. A t-test for independent samples was utilized in analyzing the posttest data resulting in determining a p-value and degrees of freedom to be used. A significant difference for the two-tailed test of significance was determined by an alpha of .05. Statistical analysis was presented in narrative form augmented with tables resulting in a full and thorough explanation of the findings of the study as related to the null hypothesis.

Summary of the Results

In this research project the pretest and posttest results of two groups of students enrolled in Untied States History at the PLC were analyzed. The analysis of the pretest and posttest data was conducted in order to determine what academic effect the adding of graphic organizers into the curriculum would have on high school students enrolled in a United States History course in a blended academic learning environment. After administering the pretest, the means of both groups were compared using a two-tailed t-test of significance. It was determined that a statistical difference did not exist between

the pretest means.

Interpretation of the Findings

The population available from which to draw a sample for this study was somewhat small; therefore, participants were selected using the convenience sampling method. However, the study's findings are useful because only a minuscule quantity of research has been conducted to determine what pedagogical strategies remain valuable in a blended instructional setting where online instruction is amalgamated with teacher-facilitated assistance. The statistical data for those students in the control group and treatment group failed to indicate the existence of a positive relationship in student learning as relating to the implementation of graphic organizers into the curriculum. However, a more in-depth or peripheral view of the students themselves, their negative and positive experiences taking the EOCT, and the testing instrument chosen by the researcher to evaluate statistical differences in scores are perhaps all needed in order to make a more judicial finding concerning the use of graphic organizers in a blended learning environment.

Relationship to Other Research

As has been revealed by this research, there has not been a plethora of research information pertaining specifically to the academic significance of coupling graphic organizers with online learning in the blended learning environment (Young, 2006). Empirical data regarding the academic value of integrating technology into the traditional classroom is sparse at best (Bowker, 2007). The research which has been published has failed to be lucid in regards to the positive effect graphic organizers have on increasing academic success. According to Hashemzadeh and Wilson (2007), with the exception of

the benefits derived by at-risk students, research to date which has focused on the benefits of using graphic organizers in a blended learning environment remains inconclusive. There is ample research which suggests employing graphic organizers in the traditional school setting is a proven pedagogical practice. There is also data associated with the use of graphic organizers among college students enrolled in online college courses. However, the researcher, by design, has strayed away from focusing on those research findings, based on the uniqueness of the high school population which was under review and the setting in which the research was conducted. However, it is prudent at this juncture to broaden the scope including related research.

As noted by Alonso et al. (2005), advancements in technology have outpaced educators in the developing of principles, strategies, tools, devices, and other pedagogical techniques which foster learning in the new technological environment. While there have been improvements in technology on a scale that rivals no other period in history, change has not been foreign to the teaching profession through the centuries. Therefore, in light of the dramatic shift in the delivery of curriculum due to technological advancements, this study sought to reveal the instructional direction educators need to pursue in order to keep in step with changing technology. It is a given that educators must continue in-service learning to stay abreast of how to operate or engage new technology. However, this study focused on discovering pedagogical strategies, operations, and methodologies which remain viable in this age of technological advancements, especially in the area of computer-based learning.

Alonso et al. (2005) conclude that while technology has advanced, totally changing the manner in which curriculum is disbursed, appropriate teaching methods

have remained constant. Therefore, there is now a need for innovative and new pedagogical strategies because the infusion e-learning has caused traditional instructional techniques to become outdated. This is the very question the researcher sought to answer. Is there indeed a need for new pedagogical strategies, or are traditional didactic strategies fitting in this technologically advanced educational environment?

When new and innovative methods of delivering curriculum burgeon, do cognitive teaching practices become ineffective and obsolete? In this technologically savvy environment, there appears to be a propensity among some to discard traditional pedagogies which Hashemzadeh and Wilson (2007) refer to as “chalk and talk” pedagogy. The assumption that e-learning and other technology-based instructional programs are superior to traditional pedagogies is widely accepted throughout the educational establishment (Hashemzadeh & Wilson, 2007).

While this study was unable to answer the question concerning the vitality of employing traditional pedagogies in concert with e-learning definitively, other studies have suggested cognitive instructional principles remain useful even when there is drastic change in delivery methods spurred on by advancements in technology. Hashemzadeh and Wilson (2007) conducted a study in a technologically enriched collegiate setting and indicated that student increased engagement and achievement were not obtained from an intensive exposure to technological instructional innovations but was instead achieved by exposure to traditional pedagogies.

Ritchie and Gimenez (1996) focused on the academic helpfulness of graphic organizers used by fourth grade students who received their instruction in a computer-based environment. The students engaged in a 20 to 30-minute science lesson using

IBM's LinkWay software. Ritchie and Gimenez found when graphic organizers were incorporated into the curriculum both short-term memory and long-term memory increased. However, the greatest improvement among the fourth grade students was seen in their long-term memory.

The researcher noted similar results among the high school students involved in this study. Although the empirical evidence did not coincide with the researcher's anecdotal notes and observations, his students appeared to master much more information when graphic organizers were introduced into the curriculum. This mastery appeared to be especially true regarding improvement of making connections between historical events and the principles of those events. Also, students' cognition of the curriculum appeared to increase when reviewing the information recorded on the graphic organizer as opposed to discussing the same information without the use of graphic organizers.

Explanation of Unanticipated Findings

Reasons for the treatment group failing to demonstrate a statistical improvement when compared to the control group whose instruction was not coupled with graphic organizers were not fortuitous. To some extent, the results could have been attributed to the researcher's failure to look forward in contemplating several issues which could have the potential to affect adversely the soundness of the testing instrument used to measure academic success. Several variables were not anticipated by the investigator and may have adversely impacted the study, which led to the retention of the null hypothesis.

The evidence the researcher has identified, which may have compromised the findings of the research, is somewhat circumstantial; however, there are subtle quantifiable evidences noted by the researcher. If more control had been given to

existential variables, the results of the statistical findings could have quite possibly shown a positive relationship between the independent variable and the dependent variable. At a minimum, the following identified implications give rise to the necessity of further study into the relationship between graphic organizers and high school students' achievement in social studies when the curriculum is delivered in a blended learning environment.

Communities in Schools (CIS), which regulates the academic policies of Performance Learning Centers (PLC's), has instituted lofty academic standards which require students to maintain an 80% minimum average in each course. By maintaining an 80% average, students lacked an incentive to strive to do their best on the EOCT since they were aware they could pass the course only by making a minimal score. This lack of concern is due in part to the method used to compute students' final grades. EOCT grades only account for 15% of a student's final course average. Although a student makes a low score on the EOCT, he can still pass the course if he maintains the 80% daily average in the course. Having this knowledge, many students simply do not strive to do their best on the EOCT.

Students are well aware of the policy regulating the mode in which EOCT scores are averaged into their final grade. Therefore, knowing they only have to perform at a minimal level, many students carelessly and insipidly take the test because they have already figured out that their other grades will compensate for a low EOCT score. The researcher and his colleagues observed students complete the test in less than 15 minutes even though they were allotted 60 minutes. The researcher has even been told by several students that they do not take the EOCT seriously because they know their performance will not adversely affect their grades.

With these prevailing sentiments, many students at the PLC no longer perceive the EOCT as a high stakes test and as a result do not engage in them as seriously as they should. Students' attitudes toward the test result in less preparation prior to the test plus a more nonchalant attitude during the test administration. This attitude is exacerbated by the fact that many of the students focus primarily on passing the social studies portion of the Georgia High School Graduation Test (GHSGT), which is a prerequisite for high school graduation. Therefore, in actuality, the high stakes value of the United States History EOCT has been marginalized by the students' knowledge that its results will not detrimentally affect their final course grade.

When the EOCT test booklets were presented to the students at the beginning and the end of the course, their reactions, both verbally and non-verbally, were almost always negative. Initially, the researcher selected the United States History EOCT as the testing instrument as the pretest and posttest because of its validity and reliability; however, in retrospect, due to the students' nonchalant attitudes and their negative connotations associated with the test, perhaps a more appropriate instrument should have been chosen.

Implications for Practice

In this section, the researcher will concentrate on the critical need for additional research to evaluate the effectiveness of both online and blended curriculum delivery instructional models as well as best pedagogical practices used in concert with those models. Alonso et al. (2005) frame the goal of e-learning by saying, "The aim for learners is to be engaged by the e-learning contents to the extent they get to understand things that they did not comprehend before" (p. 222). Especially pertinent to this investigation into educational practices and strategies which promote learning was the examination of the

educational value of employing the use of graphic organizers along with students receiving their instruction in a blended educational instructional setting. Accordingly, targeted learning objectives were linked to specific prescribed standards in a deliberate and methodical manner via teacher generated graphic organizers.

Although this particular case study failed to produce conclusive empirical evidence indicating that graphic organizers, when coupled with self-paced e-learning in a blended learning environment, had a positive effect on student learning, other similar studies have produced converse results. This project should in no way deter future researchers from investigating the educational value of employing graphic organizers in online blended academic settings. Researchers should utilize this data along with related data in continuing their search for superior pedagogical practices, which, when combined with e-learning, produces educational advancement among students. The lack of research in this area has been documented by educational researchers such as Bixler and Spotts (as cited in Alonso et al., 2005). Referring to the phenomenon of e-learning, they state, "It is a recent phenomenon that has not yet incorporated the pedagogical principles of teaching" (p. 218).

Alonso et al. (2005) state when referring to the lack of proven pedagogical practices for e-learning, "There is a serious dysfunction between the profusion of technological features that are put forward and the shortage and non-existence of teaching principles for e-learning" (p. 218). Alonso et al. further suggest that there are "… no guidelines for analyzing, designing, developing, supplying, and managing e-learning materials pedagogically" (p. 218). Specifically referring to the utility of graphic organizers within the online blended learning environment, Tergan et al. (2006) found

that "…there has not been a concerted effort in combining mapping tools such as graphic organizers which aid students in managing learning in the online computer based environment" (p. 328).

Bruce B. Friend, the Vice-President of the North American Council for Online Learning, when offering a definition for blended learning, reveals the term *blended learning* may be interpreted in various ways. His statement concerning blended learning was recorded by Sean (2007): "In many cases, blended courses are those in which teachers, working in the traditional classrooms, supplement their lessons with online material" (p. 2). However, in Friend's description of blended learning, teachers merely supplement their lessons with online materials. Still yet, Bowker (2007) construes blended learning in an expansive sense when describing a blended learning setting "…where 30% to 80% of course content is delivered online but more oversight and interaction between students and teachers is maintained"(p. 6).

It is, therefore, not unexpected that Mason (2005) would offer the following observation, "Nevertheless, despite or perhaps because of the growing use of the term *blended learning* it is increasingly losing all meaning" (p. 217). In describing the ambiguity of what might be considered a blended learning environment, Mason illustrates how the interpretation of a blended learning environment runs the pedagogical gamut:

- Reading from one set of books: 18 hours
- Browsing and analyzing web resources: 16 hours
- Working through materials provided in the virtual classroom: 8 hours
- Group work on a collaborative project: 16 hours
- E-mail interaction with tutor: 2 hours

- Online discussions with other students: 4 hours
- Individual assignment: 16 hours

A typical blend for a campus-based course might be:

- Two two-hour lectures per week
- Follow-up online seminars
- Reading from list supplied from lecturer
- Web materials from course website
- Small group presentation
- Individual assignment (p. 217)

In conclusion, the researcher synthesized the two following explanations of blended learning in developing his understanding of the term. Mason (2005) suggests, “Perhaps it is useful to consider blended learning primarily as an approach to the design of learning interventions. These interventions will be a mix of learning, media, and, methods with the aim of achieving specific learning outcomes” (p. 219). Pape (2006) espoused the following: “Blended learning spans the area between the traditional classroom and the online instructional model where course instruction is either delivered over the internet or through two-way video conferencing” (p. 3).

Limitations

The nature and size of the population available for this study posed limitations which may have jeopardized the results of the study. In a strict sense, to make generalizations on a broader population based on the evidence discovered from a relatively small sample is not a prudent research practice. The numbers of students assigned to the researcher’s United States History classes during the 2006-2007 and

2007-2008 school years were quite small; therefore, the number of students may have compromised the integrity of the research. However, not investigating distinct educational phenomena which are unique to local schools or teachers' classes and students, researchers would be failing to embrace an abundance of eclectic information. That information, when combined with similar research from other schools and districts, could form a plethora of empirical evidence from which educators could draw inferences and form hypotheses for future research.

Also, the uniqueness of the setting from which the sample was taken might as well be considered a limiting factor in generalizing the results of the study to general high school populations. The participants involved in this study were students at the PLC. As explained in the PLC's Manual (2006), the centers offer a non-traditional learning environment for high school students who are not succeeding for reasons other than ability in traditional schools. These centers create business-like learning environments where students are challenged and supported to meet their social and academic goals in a small academic setting. In addition, students complete coursework using an online computer-based curriculum, coupled with project-based learning. Teachers serve as learning facilitators as opposed to instructors assisting students with their lessons and activities.

In addition, the method in which students are selected to participate in the PLC may also be considered a restrictive factor since the results of the study may have been skewed due to the selection process. High school students or those persons of high-school age can apply for admission to the PLC. However, admission is only granted after the student is administered the Basic Achievement Skills Inventory (BASI) test and scores at

least an 8.0 in reading and math. Students are provided at least two chances to pass the BASI test. Once the student scores high enough to be considered eligible for admission, he or she is required to participate in an interview hosted by the academic administrator along with two other school personnel, one of which is required to be a facilitator. It is also required that the students' parents and or legal guardians attend the interview.

The manner in which the graphic organizers were created by the teacher could have had a negative effect on the degree to which students profited from the treatment. Learning generally increases more when students are given the opportunity to create their own graphic organizers using word programs and a host of other software available, rather than using a ready-made or teacher-made graphic organizer to accompany the lesson (Gallavan & Kotter, 2007). In this respect, students' academic success could have been thwarted by the method in which the graphic organizers were created and interwoven into the curriculum.

Recommendations for Future Research

The use of graphic organizers have many benefits, like other documents in this research project, and have been proven as pedagogical techniques in traditional classroom settings in the past. However, in relation to an online blended learning environment, which has experienced exponential growth in the recent past, much empirical evidence is needed to substantiate the educational value of continuing to implement graphic organizers as a component of instruction in this evolving instructional environment.

More research is needed among high school students enrolled in United States History courses in traditional settings and non-traditional settings as focused on in this study. There also remains a void in the academic research arena relating to determining

the effect of using graphic organizers in a blended online learning environment among those students who are academically challenged. Research in this area is urgently needed, especially based on the fact that special needs students generally profit by the use of graphic organizers in the traditional classroom setting.

In this research study, only teacher-selected graphic organizers were aligned with lessons that were associated with specific state standards. One wonders what effect there would be on student comprehension if students were granted latitude in generating their own personal organizers aligned with specific lessons. The area of comparing the effect of student-generated organizers and teacher-generated organizers on the academic achievement of high school students in an online blended environment has not been adequately explored. Research is warranted in the region of knowledge acquisition among students who devise their own graphic organizers as compared to teacher-made organizers. Results of research in this arena would not only be profitable for the online blended learning environment, but its findings could be compared to the same parameters in the traditional school setting.

Some teachers prefer graphic organizers that are partially completed through the use of key words, phrases, and examples to guide students in gleaning specific information from the text, maps, and other visual medium. In fact, it might be possible to research which types of organizers and pedagogical techniques might prove to be most beneficial as related to an online blended learning environment. Also, to expand the study, one may wish to apply and compare how organizers and their effectiveness work with exceptional students both above and below what is considered average. It would also be interesting to compare results to those who have an Individual Educational Plan (IEP)

such as students who meet the criteria for a 504 plan.

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Appendix A

Institutional Review Board's Approval

IRB Approval 575.010508: The Effect of Graphic Organizers on the Academic Achievement of High School Students using Online, Computer-Based Curriculum in United States History

Sent: Tuesday, January 29, 2008 8:44 AM

To: Conley, George Kim; Garzon, Fernando L.

Cc: Milacci, Ellen Elizabeth

Dear Kim,

We are pleased to inform you that your above study has been approved by the Liberty IRB. This approval is extended to you for one year. If data collection proceeds past one year, or if you make changes in the methodology as it pertains to human subjects, you must submit an appropriate update form to the IRB. Attached you¹ll find the forms for those cases.

Thank you for your cooperation with the IRB and we wish you well with your research project. We will be glad to send you a written memo from the Liberty IRB, as needed, upon request.

Sincerely,

Fernando Garzon, Psy.D.
IRB Chair, Liberty University
Center for Counseling and Family Studies Liberty University
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(434) 592-4054
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