

Improving Reading Comprehension with  
the Use of Graphic Organizers

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A Special Project  
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Donald K. Strother

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FACULTY APPROVAL

Improving Reading Comprehension with  
the Use of Graphic Organizers

Approved for the Faculty

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## ABSTRACT

Goldendale High School's 2007 Reading WASL scores were below the state's average. Graphic organizers were an effective educational tool that helped students understand and retain material. The effective use of graphic organizers was to be implemented in a world history classroom to improve reading comprehension. Data from twenty-two students were included in this study. Improvement in reading comprehension with occasional use (once or less per week) of graphic organizers was gauged via the Measurement of Academic Proficiency assessment from November to February. Improvement in reading comprehension with increased use (three to five times per week) of graphic organizers was then assessed from February to April using the same assessment. The use of graphic organizers did not significantly improve reading comprehension.

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## TABLE OF CONTENTS

	Page
FACULTY APPROVAL.....	ii
ABSTRACT.....	iii
PERMISSION TO STORE.....	iv
TABLE OF CONTENTS.....	v
LIST OF TABLES.....	viii
CHAPTER 1.....	1
Introduction.....	1
Background for the Project.....	1
Statement of the Problem.....	2
Purpose of the Project.....	2
Delimitations.....	3
Assumptions.....	4
Hypothesis.....	5
Null Hypothesis.....	5
Significance of the Project.....	5
Procedure.....	6
Definition of Terms.....	7
Acronyms.....	8

	Page
CHAPTER 2.....	9
Review of Selected Literature.....	9
Introduction.....	9
Reading Comprehension.....	9
Constructivist Theory.....	12
Graphic Organizers.....	14
Classroom Behavior.....	17
Measurement of Academic Progress.....	18
Washington State Essential Academic Learning Requirements...	19
No Child Left Behind.....	20
Summary.....	21
CHAPTER 3.....	22
Methodology and Treatment of Data.....	22
Introduction.....	22
Methodology.....	23
Participants.....	24
Instruments.....	24
Design.....	25
Procedure.....	26
Treatment of the Data.....	27

	Page
Summary.....	27
CHAPTER 4.....	29
Analysis of the Data.....	29
Introduction.....	29
Description of the Environment.....	29
Hypothesis.....	30
Null Hypothesis.....	31
Results of the Study.....	31
Findings.....	36
Discussion.....	36
Summary.....	37
CHAPTER 5.....	39
Summary, Conclusions and Recommendations.....	39
Summary.....	39
Conclusions.....	40
Recommendations.....	40
REFERENCES .....	41
SUPPLEMENTAL REFERENCES.....	45
APPENDICES .....	46

## LIST OF TABLES

	Page
Table 1 MAP Scores for Treatment and Control Group.....	32
Table 2 Statpak Analysis of Data for Independent t-test.....	34
Table 3 Distribution of t.....	35



## CHAPTER 1

### Introduction

#### Background for the Project

Reading comprehension was a necessary skill required for success in all grades and nearly all subject areas of education. Students had to be able to comprehend what they were reading in order for them to perform their task. Initial comprehension was necessary for students to move to higher level tasks of critical thinking. A recent movement in education was to hold students, teachers, and schools accountable through high-stakes testing.

Students needed to learn how to read at a young age, preferably between grades kindergarten through third. As students moved up grade levels they were expected to learn content while they were reading (Taylor, 2006). Graphic organizers (GO) enabled students to organize their thoughts after reading. According to Gallavan & Kottler (2007), graphic organizers helped students sort, show relationships, make meaning, and manage data quietly and easily before, during, and after reading and discussion. Graphic organizers were an excellent strategy to improve comprehension. They provided structure for organizing thoughts and allowed improved memory. Students who received training in using a tree diagram (a type of graphic organizer) performed better in comprehension and recall than those who did not (Grabe and Jiang, 2007).

Social studies was a difficult subject for students. In many cases, social studies textbooks had complex ideas and were difficult to read for some students. In other cases students had difficulty relating social studies topics and the contemporary world, or they simply had little interest in the topic (Gallavan & Kottler, 2007). Graphic organizers provided an excellent means of organizing historical events and complex ideas. There were many different types of GO, some of which were designed for topics such as classifying, sequencing events, cause and effect, description, compare and contrast, and analogies (Fisher, 2006).

#### Statement of the Problem

Reading comprehension was an extremely important skill that needed to be improved at Goldendale High School. The 2007 Washington Assessment of Student Learning (WASL) scores were below the state average in the six reading categories (Appendix A). The use of GO was a simple strategy that could be instituted to improve reading comprehension in all subject areas.

#### Purpose of the Study

The purpose of this study was to determine if reading comprehension could be improved by the practice of using graphic organizers as a reading strategy. The Measurement of Academic Proficiency (MAP) was used to assess reading comprehension gains.

### Delimitations

The Goldendale School District (GSD) had an enrollment of 1,097 as of October 2007. The male population consisted of 54.8% and females totaled 45.2%. The majority of students were Caucasian (81.5%), followed by Hispanic (9.0%), American Indian/Alaskan Native (6.3%), Asian (1.3%), and African American (0.9%). There were fifty-two and a half percent of students that received free or reduced price meals and 15% were special education students. Only 3.7% of students were transitional bilingual. The teacher population for the district was 67. Of those teachers, 77.6% had a Master's Degree and all of them were highly qualified (Washington State Office of the Superintendent of Public Instruction).

The tenth-grade classroom at Goldendale High School (GHS) that was used for this research ranged in population from 25 to 29 students over the course of the 2007-2008 school year. The research was completed using the author's second period class. The research project compared fall, winter, and spring MAP scores. Students needed to complete all three MAP assessments. Only 22 students completed all three MAP testing windows. Out of the 22, there were nine boys and 13 girls. Of these students, eight were freshmen, 14 were sophomores, and all but one (Native American) were Caucasian.

The MAP assessment was used as a pretest and posttest. To begin Phase 1, students completed the MAP assessment between October 29 and November 5, 2007 as the Phase 1 pretest. Between February 11-12, 2008, students completed the MAP assessment as a posttest for Phase 1 and a pretest for Phase 2. During Phase 1, students used a GO once or less per week. Then the students were taught effective use of graphic organizers at the beginning of Phase 2. During Phase 2, students used GO three to five times per week as the primary note-taking tool. Then a posttest MAP assessment was performed by students between April 15 and April 22, 2008. The range of improvement in reading comprehension for Phase 1 was compared with the range of improvement in reading comprehension for Phase 2.

### Assumptions

Students were taught different reading styles at different ages. Students read at different levels. Students used GO to organize their thoughts while reading or as a means of organizing what was read. The use of GO improved reading comprehension for all students.

The researcher was trained in using GO as a means of organizing information. The researcher assumed that students understood the intended use of GO and that students used them according to teacher instructions.

### Hypothesis

Students who increased use of graphic organizers had a higher range of improvement in reading comprehension on the MAP assessment test than those who occasionally used graphic organizers. The data were collected from the MAP assessment during the 2007-2008 school year.

### Null Hypothesis

Students who occasionally used graphic organizers had the same range of improvement on the MAP assessment than those who used graphic organizers on a regular basis. The data was collected from the MAP assessment during the 2007-2008 school year. Significance was determined for  $p \geq .05, .01, .001$ .

### Significance of the Project

The purpose of this project was to provide a factual base of information regarding reading comprehension and the use of GO. According to research, students' reading comprehension improved with the use of GO. The research was completed to improve student reading and organization of thoughts in order to raise student reading scores on the WASL.

### Procedure

Two phases were studied during two time periods: Phase 1 was from October 29-November 5, 2007 to February 11-12, 2008, and Phase 2 was from February 11-12, 2008 to April 15-22, 2008. On October 29-November 5, 2007,

students in study group completed the MAP assessment as a pretest for Phase 1. On February 11-12, 2008, the study group completed the MAP assessment as a posttest for Phase 1 and pretest for Phase 2. A posttest was taken on April 15-22, 2008 to complete Phase 2. Rates of improvement in reading comprehension from both time periods were used to evaluate effectiveness. Below was a detailed procedure list:

1. A study group of 22 world history students performed a pretest from October 29 to November 5, 2007. The pretest was the MAP assessment.
2. Between October 29, 2007 and February 11, 2008, students were taught world history with occasional use of the graphic organizers (Phase 1).
3. The MAP assessment was then performed by students on February 11-12, 2008. The February MAP assessment was used as a posttest (for Phase 1) to gauge student improvement in reading comprehension from November 6, 2007 to February 10, 2008.
4. The February MAP assessment was also used as a pretest (Phase 2) to gauge the rate of improvement in reading comprehension from February 13, 2008 to April 15, 2008.

5. Students were then taught World History with increased use of graphic organizers between February 13, 2008 and April 14, 2008.
6. From April 15 to April 22, 2008, the study group performed the MAP assessment as a posttest for Phase 2 to gauge improvement in reading comprehension with the use of graphic organizers.
7. Students improved at a higher percentage with increased use of graphic organizers.

This research project was approved by the Principal of GHS Clay Henry and GHS Assistant Principal/GSD Curriculum Director Chip Ferrell (Appendix B).

#### Definition of Terms

For the purpose of this study, the following words were defined:

Measurement of Academic Proficiency. A test that measured the student's academic proficiency in a particular subject area.

Zone of Proximal Development. A level of development attained when children engage in social behavior.

#### Acronym

GHS. Goldendale High School

GSD. Goldendale School District

GO. Graphic Organizer

IEP. Individualized Education Plan

MAP. Measurement of Academic Progress

EALRs. Essential Academic Learning Requirements

NCLB. No Child Left Behind

PLC. Professional Learning Community

WASL. Washington Assessment of Student Learning

## CHAPTER 2

### Review of Selected Literature

#### Introduction

The following research was conducted because students at GHS needed to improve reading scores on the WASL. Students were scoring lower than the state



average on the Reading and Writing WASL. The use of GO was a tool that teachers could implement in classrooms to improve student learning and reading comprehension.

Reading comprehension was an essential skill needed to be successful in school and life. The use of GO was an option for teachers at GHS to use in order to help students improve reading skills. The MAP assessment was a tool GHS began using in 2007 as a means for teachers to gauge current student skills. In Chapter 2, reading comprehension, the constructivist theory, graphic organizers, classroom behavior, the Measurement of Academic Proficiency, the Washington Assessment of Student Learning, and No Child Left Behind were discussed.

### Reading Comprehension

Reading was an essential function in life. It was necessary to read in order to have a chance at being successful. It was one of the most important skills that children needed to learn, and one of the most important skills for teachers to have provided. It was imperative to have achieved success.

Formation of reading skills should have begun at a young age. It was something that could have begun at home to teach as a lifelong habit, as well as building parent-child relationships to build formations of success. It was also something that should have been introduced and provided at the pre-school level.

In the public school system, however, it was a requirement to provide the necessary skills in order to be successful readers by the third or fourth grade.

Basic reading skills needed to be provided in order to foster success in all children. By the fourth grade, not only were students required to be able to read, they also were expected to learn new information and content. Reading was the catalyst that fostered learning in all content areas (Taylor, 2006).

Students who struggled with reading at an early age could have been predicted to do poorly in later grades. Students who struggled were often reluctant to read and usually had difficulty learning content from the textbooks. This created a gap between poor and efficient readers. Children needed to be able to read in order to be successful in all areas of the education system. As readers got older and they still could not read at sufficient levels, it became very aware that these students needed intensive instruction in basic reading skills. Intervention was necessary to provide opportunities for success (Torgesen, 1998).

Reading was broken down into simple steps for beginning readers. Readers needed to be able to recognize sound-symbol relationships. Readers needed to learn the sounds and symbols of their language and the relationships they have with each other. After understanding the sound-symbol relationship, students became decoders. Decoding was the process of seeing symbols together and putting them together to form word and sentence structure. When readers

became successful decoders, they moved to the more difficult task of reading fluently (Rashotte, Torgesen, and Wagner, 1994).

Hudson, Lane, and Pullen (2005) proposed that reading was comprised of three key elements: accurate reading of text, reading at a conversational rate, and appropriate expression. Reading fluency was an important step in learning how to read. It was very important to focus learning on reading fluency because of a strong correlation between fluency and reading comprehension. Sound-symbol recognition, decoding, and fluent reading were all important steps to comprehending what was read and to become a proficient reader. Being able to recognize words and groups of words was important to read fluently, as well as free up brain space for comprehension of the reading.

The brain could not try to decode while reading fluently and try to comprehend at the same time. Inaccurate word reading led to an inaccurate meaning and misinterpretations. Poor or slow decoding of the text made it difficult for the brain to interpret the text. However, when decoding and word identification became faster and easier and the cognitive resources of the brain were more easily used for comprehension (NICHD, 2000). By becoming better decoders and more fluent readers, young people gave themselves a better chance to comprehend their reading.

Children who were instructed with text-related vocabulary comprehended at a higher rate. Children who were taught vocabulary words selected based on their usefulness in language and importance to comprehension in a text had a higher rate of gains in reading than those who did not (Beck, Kucan, & McKeown, 2002). Comprehension was achieved when understanding and meaning was gained from a text reading. Comprehension abilities were the result of active reading when readers thought about the reading and made connections and inferences to understand the text. Instructional strategies improved comprehension. Some of the strategies were when students monitored their comprehension, organized information, or summarized the text.

### Constructivist Theory

Jerome Bruner noted that learning was an active process that used current and past knowledge to construct new ideas and concepts. The reader took information, constructed a hypothesis, and formed decisions based on a cognitive structure. This cognitive theory could be described as a schema that provided meaning and organization to experiences. It allowed the learner to think beyond the provided information. The students were encouraged to think on their own and discover new principles. The teacher and student conversed actively and the teacher translated information into a format equivalent to the student's current

state of understanding. Curriculums were organized in a spiral manner so students could continue to build on what was already learned (Bruner, 1973).

Jean Piaget suggested there were four principles to cognitive development. The first principle was that explanations of reality changed at different stages of cognitive development in children. The second stage suggested that cognitive development was assisted by activities and situations that engaged learners and required students to adapt. Thirdly, learning materials and activities needed to be age appropriate and at the correct level of motor or mental operations. This was necessary to avoid asking students to complete tasks that were beyond their current cognitive level. Lastly, teaching methods that actively involved and challenged students were needed to enhance learning (Piaget, 1973).

Piaget also noted that there were four primary cognitive structures. The sensorimotor stage (birth to 2 years-old) was where the infant began to know oneself and reality through interactions with the environment. The preoperational stage (ages 3 to 7) was intuitive. Children in this stage needed concrete, physical situations. During the concrete operations stage (ages 8 to 11) cognitive structure was logical and began to be abstract. The last stage, formal operations (ages 12 to 15), consisted of children becoming able to think more abstractly as well as hypothesize situations (Piaget, 1973).

Lev Vygotsky suggested that social interaction played an imperative role in cognitive development. Vygotsky (1978) stated "Every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (interpsychological) and then inside the child (intrapyschological)." Another aspect of Vygotsky's theory was the idea that the potential for cognitive development depended upon the Zone of Proximal Development (ZPD). Full development of the ZPD depended upon full social interaction. The range of skill that was developed with adult guidance or peer collaboration exceeded what was attained alone (Vygotsky, 1978).

### Graphic Organizers

Graphic organizers (GO) were an effective educational tool that helped students understand and retain material. A GO provided a clear and detailed visual that showed associations between facts, terms, and or ideas (Hall & Strangman, 2002). The GO was a tool that would organize material into a structured system of notes. According to Egan (1999), GO constructed a visual representation of knowledge to organize information and main points into a structured pattern. "Graphic organizers help students sort, show relationships, make meaning, and manage data quickly and easily before, during, and after reading and discussion," said Gallavan & Kottler (2007). The term graphic organizer was one name given to this type of tool. According to Hall & Strangman (2002), they were also

referred to as knowledge maps, concept maps, story maps, cognitive organizers, advance organizers, concept diagrams, or thinking maps.

There were many different types of GO that mapped various types of information. Simple or generic information could have been mapped using a descriptive or thematic map. Hierarchical relationships or hierarchical sets of information could be constructed into a network tree, while main idea and supporting information could be organized into a spider map. There were also maps available to organize cause and effect relationships, multiple solution problems, and compare and contrast items. Other types of maps organized more to less or low to high information, various steps or stages, circular information, and chain of action and reaction events.

The use of GO to enhance student learning had been researched quite extensively with a high rate of success. The GO had improved various skills from vocabulary to critical thinking at all levels, from elementary to high school. Hall and Strangman (2002) showed that critical thinking and higher order thinking skills were enhanced by the use of GO at the elementary, junior high and high school levels. Teacher observation and classroom performance showed evidence of improvement.

The use of GO had been proven successful for students with disabilities as well. The GO were effective in improving retention and recall for learning

disabled students at the elementary and junior high levels. There was evidence that these students retained information that was organized with the use of graphic organizers. The use of GO improved student vocabulary test scores and reading comprehension (Hudson, et al., 2005).

There were multiple studies that showed improvement in comprehension, including Gardill and Jitendra (1999), Boyle and Weishaar (1997), and Carnes, Lindbeck, and Griffin (1987) and showed no effect when the use of GO was compared to the non-use of graphic organizers. However, the students in their study were not trained in the use of graphic organizers.

In order to train students in the use of GO, teachers should model reading and provide students with many opportunities and varied levels of reading materials so students could perform independent reading at their own level or even slightly below. Teachers needed to provide direct instruction with feedback regarding note-taking and the correct use of graphic organizers. In doing so, teachers showed students the correct way to organize their thoughts and the material (Hudson, et al., 2005). As students became used to the processes, teachers could raise the reading levels. In this way it was a process of modeling and structured introduction to the use of graphic organizers.

The researcher's study included a period in which students were instructed on accurate usage of GO. The researcher modeled multiple GO examples relating



to various topics. The researcher modeled certain sections from the curriculum and organized the material into various GO types. Student work was observed and feedback was provided.

### Classroom Behavior

School classrooms often had unique characteristics that created student ownership within the classroom. Discipline plans for a school may have been created and implemented as a whole, or schools may have allowed individual classrooms to create their own. A token economy was an example of a discipline plan where students were often involved in the process of creating the rules and guidelines of the classroom. In a token economy classroom, students were rewarded for model behavior.

A GO was also a means of uniting students and improving the classroom atmosphere. The GO led to improved learning by increasing classroom engagement and keeping students on task instead of disrupting or disturbing the learning process. According to Taylor (2006), GO assisted in providing a classroom environment that was safe for learning. Strong, organized classroom environments were best suited to maximize learning. The GO provided a proven learning tool as well as improving the classroom environment as a whole.

### Measurement of Academic Progress

The Northwest Evaluation Association (NWEA) created the Measurement of Academic Progress (MAP). The MAP assessment was an adaptive test. The test could analyze individual student responses and adjust the next test question according to how well the previous question was answered. The MAP test was designed to figure out exactly the current level of each student by using a Rasch Unit (RIT). The first question a student answered was at his or her grade level. If the student struggled to read and comprehend the question and answered the question incorrectly, the computer automatically asked him/her an easier question. The computer continued to make the questions easier until the computer believed it was asking the student questions that were appropriate to the student's level. Research showed that since each question was getting easier the student would stay engaged. This was different from many assessments where a set of questions are given to all students and it measured the average ability of students within a grade. With the MAP, no questions were wasted and students attempted all questions on his or her test. This assessment gave teachers an understanding of where each student's skill level was during a particular time of the year. If given in the fall, the teacher could focus on certain academic needs, particularly if a state assessment was to be administered in the spring. The MAP assessment gave a more accurate indicator of a student's true skill level (<http://www.nwea.org/assessments/researchbased.asp>).

The MAP was a state aligned assessment. The MAP was available to be administered four times a year. At Goldendale High School (GHS), the MAP was administered three times a year. By administering the MAP multiple times per year, teachers and administrators monitored growth of students and adjusted or focused instruction according to individual needs (<http://www.nwea.org/assessments/researchbased.asp>).

The MAP was used to gauge preparedness for the Washington Assessment of Student Learning (WASL). The NWEA administered a project to compare the scale of WASL test scores with the NWEA's RIT Score. The goal was to discover performance-level scores on the RIT that could have indicated a good chance of success on the WASL. This study examined whether or not the Graphic Organizers (GO) would significantly increase students' comprehension levels. The MAP was used to gauge student progress and determine the likelihood of a student meeting standard on the WASL (<http://www.nwea.org/assessments/researchbased.asp>).

### Washington State Essential Academic Learning Requirements

The State of Washington has placed an emphasis on reading comprehension through its reading Essential Academic Learning Requirements (EALRs). The Office of the Superintendent of Public Instruction's website listed the EALRs. Among the reading EALRs: 2.1 Demonstrate evidence of reading

comprehension. 2.2 Understand and apply knowledge of text components to comprehend text. 2.3 Expand comprehension by analyzing, interpreting, and synthesizing information and ideas in literacy and informational text. To make sure that students were reaching certain levels of knowledge and achievement, students were required to pass the Washington Assessment of Student Learning (WASL). Beginning with the class of 2008, students needed to pass the Reading and Writing WASL in order to graduate from high school.

#### No Child Left Behind

A recent movement in education was to require students at certain levels to perform an evaluation to assess knowledge. The United States Federal Government had taken it upon itself to mandate that states require an assessment to gauge student performance levels. This federal legislation was known as No Child Left Behind (NCLB). According to the Department of Education's website, "*No Child Left Behind* required each state to: 1) prepare an annual report showing the greatest gains in reading achievement..." Children in grades K-3 were being targeted because research had shown that those who do well early in their schooling were much more successful in later years (Burns, Griffin, and Snow, 1998). An emphasis had been placed on reading comprehension. It was assumed that students were reading in order to comprehend the information. If this is the case, it was assumed that GO could assist students organize their comprehension.

## Summary

The focus of Chapter 2 was to address the available evidence to the topics of reading comprehension, graphic organizers, the No Child Left Behind Act, and Washington State EALRs and the WASL. The author made the following points in this chapter:

1. Reading comprehension was essential to the learning process and the learning experience. Students who were successful comprehending what they read have a higher rate of success.
2. Graphic organizers were a tool that helped improve reading comprehension.
3. The State of Washington had learning requirements that demanded successful reading comprehension be achieved. Washington State's method of assessing student performance was the WASL.
4. The MAP assessment was used to gauge preparedness for the Washington Assessment of Student Learning (WASL).

## CHAPTER 3

### Methodology and Treatment of the Data

## Introduction

In Chapter 3, the author described the desire of some teachers at GHS to improve student reading comprehension in order to improve Reading and Writing WASL scores. The use of GO was the means the author chose to address these needs. The processes and procedures the author used were outlined.

Goldendale High School's Social Studies/Language Arts Professional Learning Community (PLC) established a goal of improving WASL reading and writing scores. This PLC established common questions, activities, and rubrics that aligned with WASL standards. Graphic Organizers were another way for the PLC to help students improve understanding of reading and writing. A world history class was chosen as a study group to determine if the use of graphic organizers would improve student scores using the Measurement of Academic Proficiency (MAP). The MAP was an assessment tool that Goldendale High School implemented in the 2007-2008 school year to provide teachers a tool to gauge student progress with immediate feedback and results.

The author chose to study the use of GO and its effect on reading comprehension. The author chose to study one World History class and MAP assessment results were to gauge student progress. There were twenty-two students who completed the fall, winter, and spring MAP assessment.

## Methodology

The author chose the quantitative method of quasi experimental design with non-equivalent groups for this study. The study was completed in two phases: Phase 1, from October/November to February, and Phase 2, from February to April. The world history class completed the MAP three times, in October/November, February, and April. The February assessment was used as the posttest for Phase 1 and the pretest for Phase 2.

During Phase 1, world history students used Graphic Organizers occasionally (once or less per week) to determine the range of improvement in reading comprehension during this time period. During Phase 2, students used Graphic Organizers at an increased rate (three to five times per week). The range of improvement during Phase 1 was compared with the range of improvement for Phase 2.

Only students who took the three MAP assessments over the course of the 2007-2008 school year were included in the analyses of scores. A student who did not participate in either Phase 1 or Phase 2 was not analyzed. Only students who were in the particular world history class for the whole year and completed the MAP assessment each of the three times were included in the study. The scores were provided by the district MAP Assessment Coordinator.

### Participants

The participants came from a second-period world history classroom at GHS. Over the course of the 2007-2008 school year, there were approximately 29 students to enter or withdraw. There were twenty-two freshmen and sophomores completed the fall, winter, and spring MAP assessment and were included in this research project. There were five freshmen boys and three freshmen girls, and four sophomore boys and ten sophomore girls. One of the freshman girls was a Native American. Every other student who participated in the study was Caucasian. A different freshman girl was on an Individualized Education Plan (IEP).

### Instruments

The MAP assessment was an adaptive test. The test could analyze individual student responses and adjust the next test question according to how well the previous question was answered. The MAP test was designed to figure out exactly the current level of each student by using a Rasch Unit (RIT). The first question a student answered was at his or her grade level. If the student struggled to read and comprehend the question and answered the question incorrectly, the computer automatically asked him/her an easier question. The computer continued to make the questions easier until the computer believed it was asking the student questions that were appropriate to the student's level. Research showed that since each question was getting easier the student would stay engaged. This was different from many assessments where a set of questions are given to all students



and it measured the average ability of students within a grade. With the MAP, no question was wasted and students attempted all questions on his or her test. This assessment gave teachers an understanding of where each student's skill level was during a particular time of the year. If given in the fall, the teacher could focus on certain academic needs, particularly if a state assessment was to be administered in the spring. The MAP assessment gave a more accurate indicator of a student's true skill level (<http://www.nwea.org/assessments/researchbased.asp>).

### Design

To determine if the use of GO improved student reading comprehension, the author used an experimental quantitative method. It was a quasi-experimental design. One world history classroom used GO once or less per week between October 29, 2007 and February 11, 2008 (Phase 1). The same world history class used GO three or more times per week from February 12, 2008 until April 15, 2008 (Phase 2). The range of improvement in reading comprehension from Phase 1 was compared with the range of improvement in Phase 2. It was assumed that the increased use of GO would have improved student reading comprehension.

The range of improvement in reading comprehension was determined using the MAP assessment and comparing fall, winter, and spring scores. Students completed the MAP assessment in the fall as a pretest for Phase 1 from October

29-November 5, 2007. In the winter, students completed the MAP assessment as a posttest for Phase 1 and pretest for Phase 2 on February 11-12, 2008. The posttest for Phase 2 was completed on April 15-22, 2008 in the spring.

### Procedure

This research project used quasi-experimental design. The following procedure was followed during this project:

1. Students completed MAP assessment as a pretest to obtain an initial skill level for each student. This began Phase 1.
2. Between the pretest and the posttest MAP assessment for Phase 1, students were taught World History with a variety of note-taking strategies. Students occasionally (once a week at most) used graphic organizers during this time period.
3. At the end of Phase 1 students took a MAP assessment posttest to determine their level of skill. The researcher then recorded the range of increase (positive or negative) in reading comprehension skills between the pretest and posttest.
4. This posttest was used as a pretest for the Phase 2. During Phase 2, students were taught with an increased use of graphic organizers (three to five times a week).
5. A MAP assessment posttest was taken at the end of Phase 2.

6. The researcher then records the range of student improvement in reading comprehension from pretest to posttest for Phase 2 and compared the range of improvement in reading comprehension from Phase 1 and Phase 2.
7. It was assumed the increased use of GO during Phase 2 would result in a higher range of improvement in reading comprehension.

#### Treatment of Data

The data were analyzed by determining the range of improvement in reading comprehension from pretest to posttest for Phases 1 and 2. Phase 1 and Phase 2 had two sets of scores. A t-test for independent groups was used via Statpak (Macromedia).

#### Summary

This chapter was designed to review the methodology and treatment of data related to the use and non-use of GO. The use and non-use of GO was assessed during different time periods.

Students took a MAP assessment as a pretest between October 29 and November 5, 2007 to determine initial skill level beginning Phase 1. Students used GO occasionally between October 29, 2007 and February 11, 2008. On February 11-12, 2008, students completed the MAP assessment completing Phase 1. This was also used as a pretest to begin Phase 2, when students began

using GO at an increased rate of three to five times per week. Students performed the MAP assessment as a final posttest for Phase 2. Using the three MAP assessment reading comprehension scores for the students who completed all three MAP assessments, the range of improvement was determined for Phases 1 and 2. A t-test for independent groups was used to determine significance at .05, .01, and .001.

## CHAPTER 4

### Analysis of the Data

#### Introduction

Reading comprehension was a point of emphasis for the Social Studies and Language Arts PLC at GHS. The use of GO was going to help improve

reading comprehension scores on the WASL. Students at GHS performed below the state average on the 2007 WASL. The researcher chose to study the increased use of GO compared with occasional use in a world history class in hopes of improving reading comprehension.

### Description of the Environment

The teacher of the world history classroom was a 29 year-old teacher with four years of teaching experience. The teacher had taught world history each of those four years. The teacher had been taught the effective use and how to use it in the classroom during the 2006-2007 school year. This project was the teacher's first experience as a researcher.

The participants came from a second-period world history classroom at GHS. Over the course of the 2007-2008 school year, there were approximately 29 students to enter or withdraw. There were twenty-two freshmen and sophomores completed the fall, winter, and spring MAP assessment and were included in this research project. There were five freshmen boys and three freshmen girls, and four sophomore boys and ten sophomore girls. Only one of the freshman girls was a Native American. Every other student who participated in the study was Caucasian. A different freshman girl was on an Individualized Education Plan (IEP).

The Goldendale School District (GSD) had an enrollment of 1,097 as of October 2007. There male population consisted of 54.8% and females totaled 45.2%. The majority of students were Caucasian (81.5%), followed by Hispanic (9.0%), American Indian/Alaskan Native (6.3%), Asian (1.3%), and African American (0.9%). There were fifty-two and a half percent of students who received free or reduced price meals. There were 15% special education students. Only 3.7% of students were transitional bilingual. The teacher population for the district was 67. Of those teachers, 77.6% had a Master's Degree and all of them were highly qualified.

### Hypothesis

Students who increased use of graphic organizers had a higher range of improvement in reading comprehension on the MAP assessment test than those who occasionally used graphic organizers. The data were collected from the MAP assessment during the 2007-2008 school year.

### Null Hypothesis

Students who occasionally used graphic organizers had the same range of improvement on the MAP assessment than those who used graphic organizers on

a regular basis. The data were collected from the MAP assessment during the 2007-2008 school year. Significance was determined for  $p \geq .05, .01, .001$ .

Results of the Study

Table 1 displayed fall, winter, and spring MAP scores as completed by the 22 students involved in this research project. Students were listed S1 through S22 according to alphabetical order. Fall and winter MAP scores were displayed with range of improvement shown as the difference. This represented Phase 1. The same was done for Phase 2 (winter and spring MAP scores) and the range of improvement for Phase 2 was shown as the difference.

Table 1

MAP Scores for Treatment and Control Group

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X

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Y

Students MAP Score	Fall MAP Scores Spring MAP Score	Winter MAP Scores Difference	Difference	Winter
S1	228	221	-7	221
	210	-11		
S2	223	213	-10	213
	224	+11		
S3	221	217	-4	217
	217	0		
S4	234	232	-2	232
	235	+3		
S5	247	251	+4	251
	243	-8		
S6	248	246	-2	246
	250	+4		
S7	238	237	-1	237
	238	+1		
S8	229	235	+6	235
	229	-6		
S9	237	235	-2	235
	243	+8		
S10	234	221	-13	221
	227	+6		
S11	221	219	-2	219
	228	+9		
S12	235	228	-7	228
	227	-1		
S13	234	241	+7	241
	237	-4		
S14	233	230	-3	230
	230	0		
S15	212	214	+2	214
	213	-1		
S16	236	239	+3	239
	233	-6		
S17	233	243	+10	243
	237	-6		
S18	231	235	+4	235
	234	-1		



S19	237	238	+1	238
	235	-3		
S20	221	216	-5	216
	219	+3		
S21	233	227	-6	227
	227	0		
S22	230	223	-7	223
	234	+11		

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Table 2 showed the t-test for independent groups the researcher used to analyze the data. The number of scores for the treatment group (X) was 19 because some of the scores were duplicated. There were twenty-two scores entered. The mean of the treatment group was .47. The mean for the control group (Y) was -1.55. The t-test value was 1.05 and the degrees of freedom were 39. This information was used to determine if the researcher was able to show any significance.

Table 2

Statpak (Macromedia) Analysis of Data for Independent t-test

Statistic	Values
No. of Scores in Group X	19
Sum of Scores in Group X	9.00
Mean of Group X	.47
Sum of Squared Scores in Group X	779.00
SS of Group X	774.74
No. of Scores in Group Y	22
Sum of Scores in Group Y	-34.00
Mean of Group Y	-1.55
Sum of Squared Scores in Group Y	750.00
SS of Group Y	697.45
t-value	1.05
Degrees of Freedom	39

Table 3 showed that when the researcher used a t-test for independent groups, the t-value was 1.05 and the degrees of freedom were 39. The researcher tried to prove that with the increased use (three to five times per week) of graphic organizers, students would have a higher range of improvement in reading comprehension than those who only used graphic organizers once or less per week. The t-test showed the researcher could not show significance at .05, .01, or .001. Therefore, the null hypothesis was accepted at .05, .01, and .001. Consequently, the hypothesis, which stated student's improved reading

comprehension with increased use of graphic organizers, was not supported at .05, .01, and .001.

Table 3

Distribution of t

df	p		
	.05	.01	.001
39	2.042	2.750	3.646

### Findings

The researcher was trying to prove that when students used graphic organizers three to five times per week, their reading comprehension improved more significantly than students who used graphic organizers once a week or less. When the researcher used a t-test for independent groups, the t-value was 1.05 and the degrees of freedom were 39. The t-test was unable to show significance at .05, .01, and .001. Therefore, the null hypothesis was accepted at .05, .01, and .001. Consequently, the hypothesis, which tried to show an increased rate in reading

comprehension with the increased use of graphic organizers, was not supported at .05, .01, and .001.

### Discussion

The researcher was attempting to support the use of graphic organizers as a means to improving reading comprehension. The use of GO was supported by research and there was curriculum guides created to enhance student learning and reading comprehension with the use of GO (Fisher, 2006). Vygotsky's theory on cognitive development suggested that the use of GO individually and as a class with discussion would improve reading comprehension as well. The social interaction aspect of Vygotsky's theory supported the researcher's belief that the use of GO would improve reading comprehension.

Egan (1999) and Gallavan and Kottler (2007) suggested that the use of GO helped students organize information and their thoughts and ideas after reading. The author also believed that helping students organize their thoughts and continuing to build on these skills improved their reading comprehension. The research did not support the intended expectations.

### Summary

This chapter was designed to analyze the data and identify the findings. The hypothesis stated that students who use graphic organizers at an increased rate will have a higher range of improvement in reading comprehension than those

who use graphic organizers occasionally. The data were collected using the MAP assessment in the fall, winter, and spring. Between the fall and winter, GO were used occasionally and the range of improvement in reading comprehension was collected from the pretest (fall) and posttest (winter) MAP assessment. Then the same students used GO at a higher rate (three to five times per week) between the winter and spring MAP assessment. There was a pretest (winter MAP assessment) and posttest (spring MAP assessment) given and the difference was taken to determine the range of improvement in reading comprehension between the winter and spring with the increased use of GO.

The researcher found that there was no significant growth in reading comprehension from the winter to spring compared with fall to winter. The t-test illustrated that the researcher was unable to show significance at .05, .01, and .001. Thus, the null hypothesis was accepted at .05, .01, and .001. Therefore, the hypothesis was not supported at .05, .01, and .001.

## CHAPTER 5

### Summary, Conclusions and Recommendations

#### Introduction

Teachers and staff at GHS looked for a way to improve reading comprehension because students performed below the state average on the reading and writing WASL. A goal was set to use graphic organizers to improve student reading comprehension. The researcher studied a second period world history class that used graphic organizers occasionally during one period and compared that with a later period where students used graphic organizers 3-5 times per week. Chapter 5 summarized the project, conclusions and recommendations.

## Summary

In this study, twenty-two world history students used graphic organizers occasionally from October 29, 2007 to February 11, 2008. Their range of improvement in reading comprehension for this time period was compared their range of improvement in reading comprehension from February 13, 2008 to April 15, 2008, when the students used GO at an increased rate (three to five times per week). It was assumed that students would improve reading comprehension significantly with the increased use of GO. Reading comprehension only increased marginally. According to Gallavan & Kottler (2007), graphic organizers helped students sort, show relationships, make meaning, and manage data quietly and easily before, during, and after reading and discussion. Graphic organizers were an excellent strategy to improve comprehension. Piaget's (1973) theory of cognitive development suggested that GO would assist student comprehension as well.

## Conclusions

Based on the data shown in Table 1, students had varying results from the use of GO. Some students scored significantly lower in the spring than they did in the winter suggested the GO had a limited impact on them. During the spring there were many activities and students had also completed the WASL, which

could have lessened their interest in performing well on another assessment. The data suggested that the use of GO marginally helped students.

### Recommendations

The project could have been more effective with a higher number of students involved in the research. Using twenty-two students was a minimum number of students recommended to conduct the research. Equal and longer time periods for Phases 1 and 2 could have led to the anticipated outcome as well. Despite the fact that this project did not support the use of GO to improve reading comprehension, research showed that GO improved reading skills including comprehension.

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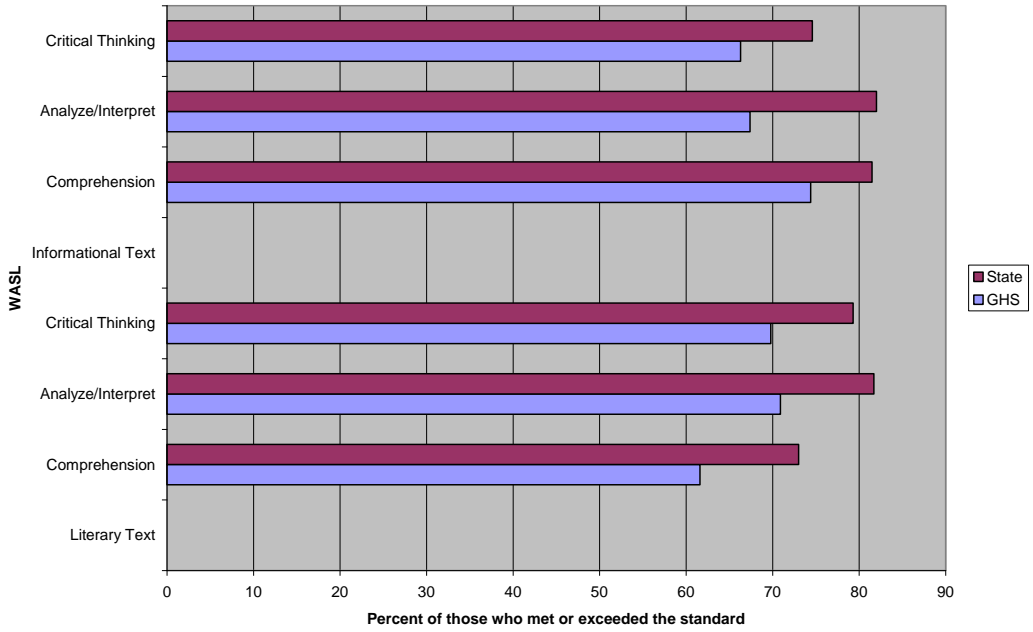
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APPENDIX

Appendix A (Washington State Office of Superintendent of Public Instruction)

2007 WASL



Appendix B

Don Strother was a world history teacher at Goldendale High School who wanted to improve student reading skills. Permission was granted to him to implement the use of graphic organizers and use student MAP scores as a part his research project for Heritage University.

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Clay Henry, Principal Goldendale High School

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Chip Ferrell, Assistant Principal/GSD Curriculum Director