

The Effect of Thinking Maps During the Planning Stage of Writing

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Submitted in Partial Fulfillment of the Requirements for the
Degree of Master of Education

May 2014

Graduate Programs in Education
Goucher College

Table of Contents

List of Tables	i
Abstract	ii
I. Introduction	1
Statement of Problem	3
Hypothesis	3
Operational Definitions	4
II. Review of the Literature	5
Thinking Maps	5
Success in Writing	8
Linking Thinking and Writing	11
III. Methods	14
Subjects	14
Instruments	15
Procedures	15
IV. Results	18
V. Discussion	19
Implications	20
Threats to Validity	20
Connections to Previous Studies	21
Suggestions for Future Research	22
References	23
Appendix A	25

List of Tables

1. Pre and Post-Test Narrative Writing Scores 18

Abstract

The purpose of this study was to determine if after explicit teaching of thinking maps, there will be no difference in the writing grades for an on-demand writing prompt using a specific rubric for third graders who use thinking maps during the planning stage of writing, compared to the writing grades of third graders before they were exposed to explicit teaching of the appropriate thinking maps for a narrative on an on-demand writing prompt. The measurement tool was a ten-point writing rubric. This study involved the use of a pretest/posttest design to compare data from February of 2014 (before explicit thinking map teaching for a narrative writing prompt) to data from April of 2014 (after the teaching was complete). Achievement gains were significant, though results could be attributable to a number of intervening factors. Research in the area of thinking maps on writing should continue given the multitude of thinking maps that can be used and the many genres of writing that exist.

CHAPTER I

INTRODUCTION

Overview

When asked the most important subjects are in school, many people would respond, “reading and mathematics.” Writing is an essential subject as well, especially in the primary grades. Writing is used in all content areas as a way to assess knowledge; therefore, students who do not know how to write correctly are at a huge disadvantage (Graham, Harris, & MacArthur, 2006). Students who are unable to write could not explain the process they use to solve a math problem or explain the thinking that they have used to problem solve. Students who write poorly also earn lower grades when writing is used to assess. There are also studies that show when writing is used in social studies and science it enhances what the student learns about the content. Also, among poor writers, the opportunity to attend college is reduced.

In order to use higher level thinking in reading and mathematics, students must be able to respond to a question by explaining their thinking, which can only be done with the ability to write accurately. Writing can be used in all subjects to enhance vocabulary and can be used for different purposes based on the curriculum. In math, writing to explain a task is often assessed, and this type of writing uses mathematic vocabulary in order to explain a specific process. Writing is also used in science in order to explain processes used to experiment. Social studies is another curricular area that uses writing in order to explain history and the world around us.

Without being able to write, students cannot see the connection between writing, reading, spelling, vocabulary, and oral language. Students who cannot write are unable to create imagery or to communicate ideas using their own words, phrases, and structures (Andrzejczak, Trainin, &

Poldberg, 2005). Another consequence to not writing well is having trouble with writing conventions such as spelling and grammar.

In order to learn to write, students must follow the writing process. There are four stages of writing that provide a way to help children understand the functions of writing and construct printed language (Calkins, 1994; Graves, 1994; Harwayne, 2001; and Ray & Cleaveland all cited in Martin & Thacker, 2009). These four stages include planning, drafting, editing, and publishing. Planning is the first step and is used to organize ideas. The drafting stage is done in order to put the ideas into complete thoughts and create a rough copy of the writing. Then editing is done to fix any grammatical errors or change ideas or content in the writing. Finally, the writing is published by taking the rough draft and edited changes and putting them into a finished product.

For students to feel supported in the writing process, each of the stages must be done in order and must be modeled thoroughly. Teachers can also support writing by developing a writing workshop wherein students have opportunities to write throughout the week, allowing for free writing time daily and exploring many genres of writing. Conferences with the teacher throughout the writing process and peer editing are other important components to ensure success.

As stated above, while students are completing the writing process it is important that the teacher models each stage. Students should not be allowed to complete each stage independently. During the planning stage, one way to help students improve their writing is to use thinking maps. For each type of writing, there is a thinking map that could be used in order to generate ideas, organize information, and plan the writing assignment. When students have planned their writing successfully, the rough draft stage should go more smoothly.

Thinking maps are a set of eight maps that people can use to organize their thoughts. The maps are designed to help generate thoughts and increase higher level thinking (Hyerle, 1995). Each map has a specific purpose and can be used alone or combined. A *circle map* is used most often for brainstorming. A *bubble map* describes emotional, sensory, and logical qualities (Hyerle, 1995). A *double bubble* compares and contrasts two items. A *tree map* is used to classify or categorize, and it can also be used when trying to compare or contrast more than two items. A *flow map* is used to put events in a sequence. A *multiflow* map shows causes and effects and helps predict outcomes (Hyerle, 1995). A *brace map* is used to take a whole and break it into parts. Finally, a *bridge map* helps to transfer or form analogies and metaphors (Hyerle, 1995).

The planning stage of the writing process is the perfect opportunity for students to use thinking maps to enhance their writing. Thinking maps allow students to plan their writing by organizing their ideas on the appropriate map and then transferring the information to their rough draft.

Statement of Problem

In order to investigate writing, the researcher developed a question to guide the project: Does explicit teaching of thinking maps during prewriting activities help students to develop the elements of a narrative, and impact their grades on a writing rubric?

Hypothesis

After explicit teaching of thinking maps, there will be no difference in the writing grades for an on-demand writing prompt using a specific rubric for third graders who use thinking maps during the planning stage of writing, compared to the writing grades of third graders before they

were exposed to explicit teaching of the appropriate thinking maps for a narrative on an on-demand writing prompt.

Operational Definitions

- *Thinking maps*- The Thinking Maps® model program consists of eight maps that correspond with fundamental thinking processes. The *circle map* is used for defining in context; the *bubble map*, describing with adjectives; the *flow map*, sequencing and ordering; the *brace map*, identifying part/whole relationships; the *tree map*, classifying/grouping; the *double bubble map*, comparing and contrasting; the *multi-flow map*, analyzing causes and effects; and the *bridge map*, seeing analogies. These maps are a "common visual language" for students in all subject areas Grades K-12("Thinking maps.org free," 2014).
- *Grades*-Numbers or letters that indicate how a student performed in a class or on a test.
- *Writing rubric*-A rubric is a scoring tool that teachers use to assess student learning after a lesson. Using a set of criteria and standards (directly tied to the stated learning objectives), educators can assess each student's performance on a wide variety of work, ranging from written essays to class projects ("About.com," 2014).

CHAPTER II

REVIEW OF THE LITERATURE

Although writing is not thought to be one of the core subjects in school, research is indicating that students must be able to write to be successful in all content areas. Unfortunately, there is much concern at this time about students' writing abilities. Students who do not learn to write correctly are at a disadvantage and tend to suffer when writing is the main way to assess their knowledge (Graham et al., 2006). Although writing is important for all students, it is most important to ensure that writing is being taught correctly at the primary age. Due to the fact that writing is so important in life, it is important to look at strategies to teach writing, what needs to be taught in writing, how to teach writing, and how entire schools can be successful at teaching writing. Thinking maps are now being used in place of graphic organizers in many school districts. These maps should be a way to help students improve their writing.

This review of the literature will discuss writing instruction. Section one will provide a review of thinking maps, a technique students can use to organize their writing. Section two will discuss the writing process, focusing on each component of the writing process and the importance of schoolwide practice across curricula. Section three will discuss the link between writing and thinking by sharing the benefits that thinking maps have on writing.

Thinking Maps

Thinking maps provide a way for students in grades K-12 to organize their thoughts using eight maps that follow specific thought processes. The maps are designed in such a way to help generate thoughts as well as organize those thoughts and have students use higher level thinking (Hyerle, 1995). Professional development training has taught the researcher that thinking maps can be a way to organize all information. With writing, these maps can be used during the

prewriting stages in order to allow for student brainstorming and thinking. Once this is done, students can take the organized information they have collected and feel more confident and prepared for their writing task. One difference between thinking maps and other graphic organizers is that students are making their own maps and therefore can expand their thinking. A student's thinking is never limited when using thinking maps, but graphic organizers provide a preprinted sheet that students fill in. When students are given the opportunity to use thinking maps, they draw the maps themselves, which allows them to demonstrate unlimited thinking. Thinking maps can be done on paper or done using a software program that incorporates the maps. They can be used for simple or complex thinking (Hyerle, 1995). They are also different because thinking maps help students to think strategically, yet graphic organizers do not. Thinking maps allow the learner to see the whole process of coming to the correct answer. There are eight fundamental thinking processes and Hyerle was able to develop eight maps to match them, instead of the 400 graphic organizers that are used to represent the same thinking processes (Holzman, 2004).

The eight different maps can be used alone or can be combined, but they each have their own purpose. A *circle map* helps define words or things in context and presents points of view (Hyerle, 1995). It is used most often for brainstorming. A *bubble map* describes emotional, sensory, and logical qualities (Hyerle, 1995). This map must use adjectives to describe whatever object/person is in the center. A *double bubble* compares and contrasts two items. If a student is contrasting, he or she cannot say one item has this and one item does not have this; he or she must find a counter statement. A *tree map* is used to classify or categorize, and it can also be used when trying to compare or contrast more than two items. This map can be used to summarize, as it lends itself to finding the main idea and supporting details that match. A *flow*

map is used to put events in a sequence. A *multiflow* map shows causes and effects and helps predict outcomes (Hyerle, 1995). This can be a good strategy to build background knowledge or just identify effects or causes for one situation. The situation must always have a verb in the sentence. A *brace map* is used to take a whole and break it into parts. This must be something that can be seen physically breaking down. Finally, a *bridge map* helps to transfer or form analogies and metaphors (Hyerle, 1995). This is used often to show relationships and must have a relating factor. Hyerle (1995) states, “Teachers are trained to introduce students to all eight maps as a related set of tools for content learning. They then show the students how to use these maps as needed, isolated or together. Teachers can do this in a short time because each map is a concrete tool rather than an abstract definition” (p. 86).

Thinking maps are tools that can be used and are helpful in all content areas. Hyerle (1995) explains just how a bubble map can be used in the different content areas by saying, “Students use it in analyzing character traits in language arts, attributes in mathematics, properties in science, and cultural traits in social studies” (p. 86). It can also be used in writing to create a character with specific traits. Not only can one map be used in several areas, but also one area can use several maps. Hyerle discusses how students can read a story and discuss character traits using a bubble map and then use a double bubble to compare two of the characters. Finally, the student can take the same story and then organize the plot and events using a flow map.

To use them correctly, teachers and schools must be trained in thinking maps. Hyerle (1995) spoke with several teachers who have used thinking maps, and they believed that it is critical for all teachers in a school to be trained so that they can use them schoolwide. Having

schoolwide cooperation allows students to use thinking maps in all curriculum areas, when working on their own, or in cooperative groups. Hyerle says,

This linking of different patterns of thinking when analyzing literature is similar to structuring information and constructing knowledge in other content areas. Indeed, one can use visual representations as key tools for concept development and for the interpretation and assimilation of new information in every content area. (p. 87)

Using only eight maps schoolwide and in all content areas helps students to understand the importance of each one and when it should be used. Schoolwide implementation also allows students to use an advanced thinking process to gather all of their thoughts.

Success in Writing

In Anne Arundel County, Maryland, third grade students are expected to write a paper that is about three paragraphs long and that follows the correct writing process. In order for students to do this, they must be taught to write correctly. Before working on the writing process, students must be taught the different genres of writing. This is what gives them the prior knowledge that they need to be successful (Read, 2010). Read (2010) says, “Teaching writing through genres can help students understand and respond to the expectations of writing situations” (p. 47). Along with this knowledge, students in the third grade must be exposed to different forms of writing and writing conventions. The most important thing for students to learn and do as they write is to follow the writing process.

The writing process provides a way to help children construct printed language and understand the functions of it (Calkins, 1994; Graves, 1994; Harwayne, 2001; Ray & Cleaveland as cited in Martin & Thacker, 2009). There are four steps in the writing process that include planning, drafting, editing, and publishing. The most important thing to remember is that,

throughout the entire process, modeling by the teacher is taking place. The *planning* step is where students brainstorm ideas that they want to write about. This is a time for students to organize their thoughts and plan out their writing. Next, students *create a draft*. The *editing* stage has two parts, revising and editing. *Revising* is when the students look back through the paper and change or add to the actual writing, for example, adding vocabulary and more detail to their work. *Editing* is when the students fix grammatical errors in the writing. Editing can be done, alone, with a peer, and/or with the teacher. Finally students *publish* their work. The important thing to remember is that students can go back to any stage of the writing process before moving forward (Martin & Thacker, 2009).

To be successful writers, students must see the connection between writing, reading, spelling, vocabulary, and oral language. It is helpful for schools to develop a writing workshop during which students have several chances a week to write. Using fiction and nonfiction literature helps to incorporate these ideas in writing. These strategies can elicit story comprehension, phonemic awareness, and predictions, and they allow the student to make sense of the text. Once students understand a text, they can then successfully write about the topic (Nurss, Abbott-Shim, & McCarty, 1999). To be able to write successfully, a student must use the strategies available for reading. Reading can be done without writing, but writing cannot be done if one cannot read (Almy et al. as cited in Ferrara, 1990). Andrzejczak et al. (2005) state, “The process of writing is more than putting words on a piece of paper. Effective authors are able to create imagery and to communicate ideas using well-chosen words, phrases, and text structures” (p. 2).

The use of vocabulary enhances writing, just as reading does. Students who struggle with writing and the writing process are students who have trouble with conventions such as spelling

and grammar. These students also have limited vocabularies (Romeo, 2008). This is why it is so important to make sure writing is linked in all areas. Although struggling students need to be helped, it is critical to look at students who show positive writing characteristics in order to see what they do and assess how they use reading, oral language, and vocabulary to be successful.

There are several characteristics that make elementary students proficient writers. Good writers use prior knowledge to complete all stages of the writing process. They also take the writing process seriously and slowly, so that they do each step thoroughly and correctly. Not only do good writers follow the writing process, but they revisit each step in order to add and change their writing. Finally, these students reflect on their writing often (Romeo, 2008). Although it sounds as if good writers simply follow the writing process, they are not able to do this if they have not had proper instruction or understand the connection writing has to other areas in language arts or the other content areas.

When students are asked to write in the different content areas, they often feel unsure of what to do. If students were taught the writing process and strategies, they may not feel as overwhelmed when given these tasks. Writing can be used the same way in all areas as long as it is a schoolwide procedure and progresses properly from year to year. However, this takes staff development and planning. Schools need to pick which strategy to use and follow it. Hyerle (1995) says,

In a learning community, thinking maps become a common visual language among students and between students and teachers - not only within content areas but also across disciplines. In the thinking maps transfer approach, we work with whole schools over several years. This is essential because it offers all-important continuous support for students as they move through grade levels. (p. 88)

The transfer approach is when the schools receive professional development on thinking maps and transfer over to using only thinking maps and doing away with all graphic organizers. That is the reason it is so important to begin the program schoolwide and present all staff members with the pertinent information.

Staff development meetings can help to ensure that writing is taught the same way throughout the elementary years. When it comes to thinking maps and staff development, Hyerle (1995) shares, “The teachers embraced these maps because they were able to incorporate them directly into their everyday questioning techniques and classroom activities. Students learned the maps easily because the maps were reinforced across the whole school” (p. 88).

Atlanta Public Schools believed that having a strong development program for the staff was key to student success and so used a staff development plan to encourage writing in classrooms. The goal in Atlanta Public Schools was to see the progress over four years. Each principal had to watch and keep data to assess whether or not there was progress. Doing this made sure that there was a follow-up to the staff development meetings. Often, schools have meetings to share new ideas, yet the principal never checks up on the staff to make sure it is actually being used (Nurss et al., 1999). Nurss et al. (1999) conclude, “Key to success was the developmental continuum of writing which helped teachers to focus on individual children’s progress” (pps. 9-10). This helps to support the importance of vertical teaming and schoolwide teaching strategies.

Linking Thinking and Writing

Writing is the most difficult language process, whether you are an elementary student or a college student. It is hard to just start writing (Buckley, Boyle, & California University, 1981). Using mapping to organize thoughts is useful. Hyerle (1995) expresses, “By using visual tools

that correspond to thinking processes, students can organize their ideas on paper or by computer, and - as a result - read, write, and think better” (p. 85) Students spend so much time trying to come up with ideas to write about, without having much luck, that they end up hating writing. Using mapping as a strategy gives students a simple and quick way to organize their thoughts (Buckley et al., 1981).

Using thinking maps is a way to organize thoughts in a less complex way. Because there are only eight maps, each with a specific purpose, students can easily organize their thoughts for any type of writing that they need to do. Thinking maps correspond with the thinking process in order to help students organize ideas this in turn helps to not only write better but to read and think better. They are visual tools to represent how to organize, analyze, and evaluate what one reads, writes, or thinks about (Hyerle as cited in Gallagher, 2011) Using this schoolwide makes it uniform and even more appealing to the students. “Researchers have found that presenting selected graphic organizers on computers helps students to see the relationships between main ideas and supporting details (as in the tree map), and that this in turn leads to higher scores on reading and writing tests,” (Hyerle, 1995, p. 87). In North Carolina there were significant increases in writing test scores after using thinking maps, and students even enjoyed using them (Hyerle, 1995).

Using mapping has many positive outcomes. Maps are easy to share, easy to learn, can be done with words or pictures, and can be representative of many things. Buckley et al. (1981) say, “Mapping adds a visual dimension to our students’ linear thinking, through using this visual method, combined with their verbal abilities, students gain a power greater than the sum of two parts” (p. 16). Mapping also aids learners of all styles, incorporating several strengths for each type. Osman-Jouchoux (1997) conducted a pilot study for a unit on summarizing to determine whether reading strategies and concept mapping could be used to improve student writing. He

found that the concept maps allowed the learners to organize their understanding of the text. If students use thinking maps, which are similar to concept maps, perhaps the same results could be seen.

Thinking maps can be used during the entire planning process to organize thoughts for writing. If students are writing a fictional story, they can use a bubble map to choose characteristics of his or her character. Students can then use a tree map to organize the story elements. Once students have their big ideas, they can move on to a flow map to sequence their story. All of this additional planning and organizing should help them to be successful in their writing, just as other concept mapping was useful. According to Hyerle (1995), in schools that have used thinking maps, “The teachers agreed that the maps had successfully helped students develop their thinking processes and their ability to organize ideas, improved the quality and quantity of their writing, and also motivated them to learn. Further, the maps benefited the teachers by helping them organize content and assess student learning,” (p. 88).

Summary

In conclusion, literature shares how difficult writing can be for all students, yet it is an important skill in life. Literature also shows that the use of mapping in writing helps students to organize information in such a way that their writing can become easier for them to complete. Each thinking map has a specific purpose, but all can be used across the content areas in all grade levels. Thinking maps can be implemented schoolwide, which should make students more familiar and comfortable with using them. In order to be a successful writer, a student must use the writing process and complete each step of the writing process carefully. Educators need to model these strategies so that students can become successful at brainstorming and writing.

CHAPTER III

METHODS

Procedures

The purpose of this study was to explore whether explicit teaching of thinking maps during pre-writing activities would impact students to develop the elements of a narrative, and impact their grades on a writing rubric.

Subjects

The subjects for this study were third grade students at a midsize elementary school in Annapolis, Maryland. This school is part of the Annapolis Cluster and is a public school serving grades Pre-K to 5. There are currently 442 students enrolled in the school with the following ethnic representation: 69% white, 12% black, 10% Hispanic, 4% Asian, and the remaining students of mixed ethnicity. For the 2013 Maryland State Assessments, 86% of students in third grade score proficient or advanced in reading and math. Grade 4 students scored 90% proficient or advanced in reading and 96% in math. Fifth grade students were 98% proficient or advanced in reading and 92% in math.

Students who participated in this study were third grade students with knowledge of thinking maps and writing skills. These students have used thinking maps after those maps were modeled by a teacher and have had opportunities to use the maps on their own in classroom activities. They have had mini-lessons on language conventions and have learned how to read and use a writing rubric and follow the writing process. These students have had experience with writing three paragraphs on narratives and with writing biographies. There were 18 students who participated in this study. Out of the 18 students, there was one ESOL student, one special

education student, and four eligible for Free and Reduced Meals (FARMS). In this study, there were thirteen white students, two black students, two Hispanic, and one Asian student.

Instrument

The writing task that the students were given was an on-demand narrative writing pre-assessment. Students were given a short narrative story to read. The writing prompt the students were expected to complete said, “After reading the story *Fun in the Snow*, use the writing rubric to write your own snow story, using the same title *Fun in the Snow*.” This same task was given as a mid-test and post-assessment after explicit teaching of thinking maps with a new short story. The rubric is attached as Appendix A.

Procedures

Due to the fact that thinking maps have been taught and used in the classroom previously, the first step was to have students complete a pre-assessment to determine whether they would use a thinking map to plan their writing on their own and whether it would have any effect on their writing. The attached rubric was given to the students along with a narrative, *Fun in the Snow*, to read and the writing prompt. Students had 45 minutes to read the narrative, review the rubric, and write their own story. After this task was completed, each writing piece was graded based on the rubric.

The next step was to explicitly teach thinking maps for a narrative. The teacher read a new narrative entitled *First Airplane Trip* to the students. The writing prompt was the same as the pre-assessment, “After reading the story *First Airplane Trip*, use the writing rubric to write your own airplane story, using the same title *First Airplane Trip*.” The teacher modeled how to read the rubric, how to break it down to be exactly sure of the demands of the prompt, and then how to decide which thinking map to use. After discussion, it was noted that the narrative must

include characters, setting, and plot. A *tree map* would lend itself best for this purpose. The teacher modeled a *tree map* with the title *First Airplane Trip*. The branches included character, setting, and plot, which was broken into beginning, middle, and end. After the teacher modeled this, the students were required to create their own *tree map* using the same title and branches.

The teacher and students had a discussion about how to take the *tree map* to the rough draft. With prompting from the teacher, the consensus was that even with a *tree map* completed, which was necessary to include the proper story elements, students still had to come up with many ideas before moving to the rough draft. Students were informed that the ideas should take place in the planning stage, so that when they are ready to begin the rough draft, the ideas are there; they just need to be constructed into full sentences. There would need to be another thinking map during the planning stage. A *flow map* would be necessary to expand on the plot (beginning, middle, and end) from the *tree map*. This would allow for more in-depth ideas and would create planning so that the rough draft would come naturally. The teacher then modeled the expansion of the beginning, middle, and end onto the *flow map*. After students repeated this step with their own ideas, the teacher modeled how to box the beginning ideas in green, the middle ideas in yellow, and the ending ideas in red. This would allow for the students to easily separate their story into three paragraphs. Students then repeated this step as well.

The next day the teacher modeled how to take the ideas from the *flow map* and put them into paragraph form in order to create a rough draft. It was then the students' turn to do this as well. The teacher again modeled the revision and editing stage, followed by the students completing this stage. Lastly, modeling and practice with the final draft ensued.

Following the modeled stages of the writing process, the students were given a mid-assessment. This was the same as the pre-assessment, as it was a 45-minute, on-demand writing.

The students read a narrative called *The Scarcity Story* and then used the rubric and writing prompt in order to create their own narrative using the same title.

Once the *The Scarcity Story* was graded, the teacher noticed that all students used a thinking map to organize ideas. Not all students use both a tree map and a flow map. The teacher held conferences with students who only used one thinking map. Their paper was shown to them and the teacher discussed again how it is useful to use both a tree map and a flow map in order to plan for a narrative.

A week later the students were given one more 45-minute, on-demand writing. This was again the same as the pre-assessment. The students read a new narrative and then used the rubric and writing prompt in order to create their own narrative using the same title.

CHAPTER IV

RESULTS

The purpose of this study was to examine the influence of explicit teaching of thinking maps on third graders' narrative writing.

The pre- and posttest narrative writing scores for third graders after 1.5 months of instruction on thinking maps were analyzed using a t test for paired subjects. The results are presented in Table 1 below.

Table 1

Pre- and Posttest Narrative Writing Scores

Test	Mean	N	Standard Deviation	t	Significance
Pretest	5.8	18	2.85	3.51	0.003*
Posttest	8.9	18	1.10		

***p < 0.01**

The hypothesis that after explicit teaching of thinking maps there will be no difference in the writing grades for an on-demand writing prompt using a specific rubric for third graders who use thinking maps during the planning stage of writing compared to the writing grades of third graders before they were exposed to explicit teaching of the appropriate thinking maps for a narrative on an on-demand writing prompt was rejected.

CHAPTER V

DISCUSSION

This study has demonstrated that explicit teaching of thinking maps has a positive effect on third graders' narrative writing. When the pretest was given, only 10 out of 18 students used thinking maps. There were two thinking maps that were appropriate for this type of narrative writing and that work best when used in combination. On the pretest, none of the ten students used both thinking maps, eight students used a tree map, and two students used a flow map to organize their writing. The rubric was based off of a ten-point scale, and the mean score for the pretest was 5.8.

Following the administration of the pretest, explicit teaching and modeling of both thinking maps was done to determine whether that would help students improve their writing scores. On the midtest, all 18 students used some type of thinking map. There were six students who used both a tree map and a flow map as taught and modeled, 11 students who used a tree map only, and one student who used only a flow map to plan his writing. The mean score for the midtest was 7.8, which showed improvement from the pretest.

After the midtest, the teacher held conferences with all students and reviewed students' midtest scores with them. During the conferences, the teacher explained the importance of using both thinking maps in the planning stage of writing. When the posttest was administered, it was discovered that all 18 students used both a tree map and a flow map to organize their writing. The mean score for the posttest was 8.9, showing improvement from the midtest and an overall improvement of 3.1 points above the pretest average. The posttest writing score was significantly higher than the pretest score.

Implications

The study is important because thinking maps are being introduced to students in schools all over the world. Research shows that using thinking maps can improve student achievement. This is notable because writing is an essential skill for students to be successful, and learning and using thinking maps gives students a way to organize their thinking and then use their thoughts later in the writing process.

Since the researcher is a trainer-of-trainers for thinking maps, this is helpful information to bring to the staff at the study school in order to show the usefulness of thinking maps and to help fellow educators to understand that value and how students' use of thinking maps can make a difference in their performance. Often teachers do not want to hear about another "thing" to do in the classroom, but actual student achievement can demonstrate to teachers that thinking maps are not just another fad.

The researcher and her team have also used this data in order to write Student Learning Objectives (SLOs) for writing. An SLO involves choosing one area of improvement needed for students and the subsequent use of explicit teaching in order to focus on that area of need. This study has demonstrated that thinking maps can improve student achievement and that thinking maps may be effective in other subject areas as well.

Threats to Validity

Although thinking maps have shown improvement in writing, there are other factors that could have affected the reliability of the results. For one, after the midtest the teacher held conferences with the students and reviewed the importance of using both thinking maps combined when writing a narrative. This could have influenced those students' use of thinking maps in the posttest. Additionally, only one class was used in the testing, and this could skew

results because it was a small group. Also, only one teacher administered the testing; had other teachers been involved, the results may have differed.

Another mitigating factor is that there was no control group in this study for comparison purposes. The improvement in narrative writing may have been due to maturation. Over time, students become more successful with curriculum, potentially increasing their score. Furthermore, throughout the month, teaching of other elements on the rubric such as setting, adding details, and time order words could also have affected the students' scores. Lastly, the topic of each writing prompt was different. Students may have found one topic more appealing than another or easier to write about.

Connections to Previous Studies

Osman-Jouchoux (1997) used a pilot study for a unit on summarizing to determine whether reading strategies and concept mapping could be used to improve student writing. He found that the concept maps allowed learners to organize their understanding of the text. The current study also demonstrated that thinking maps, which are similar to concept maps, enable students to effectively organize information.

Hyerle (1995) said in schools that have used thinking maps, "The teachers agreed that the maps had successfully helped students develop their thinking processes and their ability to organize ideas, improved the quality and quantity of their writing, and also motivated them to learn" (p. 88). The research results of the current study correspond with Hyerle's findings as well because students in the study school showed improvement in their overall narrative writing when using thinking maps.

Suggestions for Future Research

This study could be improved by using it for different types of writing samples. In this study, thinking maps were used to organize information for a narrative. It would be helpful to test the use of thinking maps with multiple types of writing, such as opinion writing, biographies, and poetry. In addition, it would be helpful to have a larger research group. In the current study, using a larger sample size was not possible because different teachers used different methods of teaching, so the results would have been inaccurate. Finally, using a control group would also be a way to determine whether thinking maps acted as the one factor that improved achievement or whether the teaching of other skills was the determining factor.

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Appendix A

Name _____ Date _____

NARRATIVE ASSESSMENT RUBRIC

	2	1	0
Planned writing with an organizer	Appropriate organizer made and ideas completed	Organizer present but ideas are not complete and/or does not relate to text	No organizer used
Organizer referenced	Published copy shows student referenced organizer to create	Published copy shows little reference to organizer	Published copy shows no reference to organizer
Story Elements in narrative	Narrative has characters , developed setting , and plot	Narrative has two of the story elements developed	Narrative includes one or fewer developed elements
Organized	Narrative has a clear and detailed beginning, middle and end	Narrative has one undeveloped area (beginning, middle, or end)	Narrative had two or more undeveloped areas (beginning, middle, or end)
Time order words	Narrative uses time order words to transition to each new event	Narrative uses some time order words to transition to each new event	Narrative does not use time order words to transition to each new event
Total points			