CALIFORNIA STATE UNIVERSITY SAN MARCOS

THESIS SIGNATURE PAGE

THESIS SUBMITTED IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE

MASTER OF ARTS

IN

EDUCATION

THESIS TITLE: The Application of Manipulatives in the Writing Process
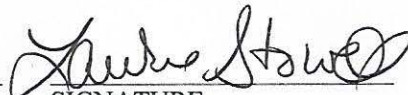
AUTHOR: Jenna K. Murphy

DATE OF SUCCESSFUL DEFENSE: May 04, 2017

THE THESIS HAS BEEN ACCEPTED BY THE THESIS COMMITTEE IN
PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF ARTS IN
EDUCATION.

| Laurie Stowell, PhD | _Laurie Stowell_ | 5.4.17 |
| THESIS COMMITTEE CHAIR | SIGNATURE | DATE |

| Erika Daniels, PhD | _Erika Daniels_ | 5.4.17 |
| THESIS COMMITTEE MEMBER | SIGNATURE | DATE |

| N/A | | |
| THESIS COMMITTEE MEMBER | SIGNATURE | DATE |

The Application of Manipulatives in the Writing Process

by

Jenna K. Murphy

A Research Paper
Submitted in Partial Fulfillment of the
Requirements for the
Master of Arts Degree
in

Education

California State University San Marcos

Spring, 2017

Thesis Abstract

        This thesis study used mixed-methods research design to study the application of manipulatives as a writing tool for middle school students. The manipulatives used in this study were plastic. colorful linking cubes. The research question for this study was: "How do manipulatives impact middle school students in revising argumentative writing?" To analyze how manipulatives impact special populations, this study also examined the following sub-groups: females, males, special education students (SPED), and English Learners (EL). This study also specifically analyzed student growth in organizing writing in addition to overall growth as measured by a general rubric. The findings revealed that the participants thought the manipulatives were more helpful as a revision tool in the first trial than in the second trial. More males thought they were helpful in both trials than females. SPED and EL participants both thought they were most helpful during the first trial. The results showed that the population experienced steady growth in both overall rubric scores and in organization. Males grew more in these areas than females. SPED participants grew more than EL participants in organization, but EL participants grew more than SPED participants in overall rubric scores. Ultimately, this research demonstrated that hands-on, kinesthetic methods can be valuable in writing classes, but that students should have a choice regarding the strategies they use to improve their writing.

        Keywords: adolescents, kinesthetic, manipulatives, organization, writing.

Acknowledgments

The completion of this research would not have been possible without the support of my husband, Ryan. Thank you for loving me through this. Thank you also to my thesis committee members: Laurie Stowell, PhD and Erika Daniels, PhD. Both have been my mentors in teaching and learning, and I am honored they were a part of this process. My students, too, deserve recognition as they served as willing participants in this study. I am grateful and humbled to be their teacher.

List of Figures

List of Charts

Table of Contents

Chapter One: Definition of Problem

Writing instruction in middle school classrooms must be developmentally appropriate to the needs of adolescents. Teachers should integrate movement throughout the day in order to keep students motivated and engaged in learning. The needs of middle school students are diverse, and teachers should create lessons that respond to different learning styles as well as supporting academic requirements. One way to do this is to incorporate hands-on learning in the classroom.

Purpose of Research/Statement of the Problem

Kinesthetic or hands-on learning can be beneficial for students of any age as it encourages a tactile approach to concepts that may otherwise be abstracted by language. This research addresses the kinesthetic learning element in the writing classroom. In particular, this study examines how writing can be approached using hands-on strategies, such as manipulatives, to make sense of what can be a complex and abstract process. Often seen in math classrooms, manipulatives are defined as tactile, movable pieces that can be used to show relationships and represent processes.

Building upon previous research that demonstrates manipulating and using toys during the writing process can assist students in the development of their work, this research explores one of these strategies with a group of adolescent seventh grade students in their Language Arts classes. Using both qualitative and quantitative research methods, this mixed-methods study addresses whether manipulatives prove helpful to students as they move from a first draft of an argumentative essay to their final draft. Specifically, this study analyzes whether students improved in organizing their ideas throughout the paper after using the manipulatives to build a three-dimensional model of the flow of claims, evidence, and explanation in their writing. The

goal of this research is to determine the practical uses of manipulatives in the writing classroom and offer suggestions to teachers. The research question under inquiry is "how do manipulatives impact middle school students in revising argumentative writing?" The sub question for this study is "how can manipulatives benefit students with unique learning needs at the revision stage of the writing process?"

Preview Literature

Manipulatives as a Learning Tool

Wilkins (1995) claims that "the kinesthetic channel is the great forgotten learning channel in American classrooms. Most children learn best when there are tangible, concrete manipulatives that help explain an abstract or complex concept" (Wilkins, 1995, p. 4). These manipulatives come in a variety of different forms, from tiles arranged in two dimensions to interlocking blocks that can form three dimensional models. They are defined as "objects that appeal to several senses and that can be touched, moved about, rearranged, and otherwise handled by children" (Kennedy, 1986, p. 6). Using manipulatives engages the kinesthetic intelligence of touch and physical movement while simultaneously activating the spatial intelligence of solving puzzles and design thinking.

Multiple Intelligences and the Writing Process

The writing process, which encompasses multiple recursive stages from brainstorming to drafting to revision, is traditionally taught using language-based methods. Prompts, outlines, and rubrics use words to communicate the task, the structure, and the criteria for assessment. While these tools may be useful for many students whose language skills are proficient, struggling writers may experience challenges when only words are used to explain the complexities of academic writing. Gardner's theory of multiple intelligences (1983) made an impact on

education when he posited that people possess varying degrees of intelligence in a variety of

categories. Privileging a select few intelligences in the classroom could marginalize students

who are not as proficient in those areas. While Gardner's ideas have been disputed in academic

circles, educators cannot ignore the reality that every student has struggles and strengths that

they bring to the classroom environment. The teacher's mission is to enhance the strengths of

each student and bolster their weaknesses. Incorporating a range of activities that appeal to a

variety of intelligences will ensure more student engagement and may lead to more depth of

understanding.

Writing Challenges for Adolescents

Middle school classrooms encompass student populations with diverse academic abilities,

and writing presents challenges for many of these students. Adolescence causes changes in the

brain, and this process can result in moments of extreme activity and extreme lethargy (National

Middle School Association, 2010). Even if students in a middle school class are academically

gifted, developmentally their brains and bodies need more than simply sitting and putting pen to

paper for an hour. Students with learning disabilities ranging from Attention Deficit Disorder

(ADD) and Attention Deficit Hyperactive Disorder (ADHD) to specific learning disabilities

involving auditory processing or working memory have been known to struggle with writing and

the intricacies of its process (De la Paz, 2001; Englert & Raphael, 1988; McCutchen, 1988;

Thomas, Englert, & Gregg, 1987). A typical essay produced by a student with a learning

disability will likely draw upon the student's background knowledge rather than sources,

culminating in a string of ideas in which each preceding idea generates the next (De la Paz,

2001). This approach results in a paper that may be off-topic, disorganized, and pay little

attention to the audience. Because middle school students are at a unique developmental stage,

using multiple modalities and approaches to learning are necessary for reaching diverse learners (Salyers & McKee, n.d.).

Gaps in the Current Research

Hecker (1997) researched ways that students at Landmark College, which is devoted to serving students with learning disabilities, could utilize kinesthetic and spatial intelligences throughout the writing process. These intelligences refer to body motion and visualizing with the mind's eye, respectively (Gardner, 1983). In her research, Hecker explored how manipulatives could be used as a model for rhetorical forms so that students could physically see the ways their ideas and rhetoric flowed throughout a draft of their paper. While the research was primarily testimonial, its implications for writing instruction are worth investigating.

Goldsby's (2009) research summary of studies that examined manipulative use found that the middle grades are often sidelined in studies: "Current research on the use of manipulatives in the middle grades is not as extensive as research on manipulative use in the elementary grades and with students with disabilities (Cobb, 1995; Driscoll, 1980; Sowell, 1989; Suydam & Higgins, 1977). Many articles on manipulatives are anecdotal descriptions of their classroom use rather than research studies. Some teachers have engaged in action research in their own classrooms (e.g., Lach, 2005) to report the benefits of manipulative use. Research in secondary classrooms has focused on algebra tiles, geoboards, virtual manipulatives (computer), and tiles (Sharp, 1995; Takahashi, 2002)" (Goldsby, 2009, p. 1).

The gaps in the existing research express a need for more data on adolescents in the middle grades and further analysis on how manipulatives can be used as a learning tool in writing classrooms. This study replicates Hecker's suggestions to investigate their applications for adolescents.

Preview Methodology

The research methods for this study are mixed-methods, as both quantitative and qualitative data are collected and analyzed. The quantitative data in this research consists of numerical essay scores from three essays scored using the same rubric for each series of scores. This researcher scored each of the essays. The qualitative data consists of interviews with students and the informal observation notes of this researcher.

The population for this study includes 62 seventh grade students in a Southern California middle school. The participants come from a range of backgrounds and socioeconomic situations. Their academic abilities are diverse, with some achieving well below grade level and others exceeding the grade level standards. Some students received services for learning disabilities or English language development. The sample under study is one of convenience, since this researcher is the English teacher for all 62 students.

Throughout the Fall 2016 semester of seventh grade English, the students developed argumentative writing skills and learned to write analyses of texts. In September, the participants wrote a pre-assessment essay that gave baseline data. Two additional essays, a practice assessment in late October and a post-assessment in early December, were also written, and they provided growth data for this study. While writing the practice assessment and post-assessment essays, the participants had access to manipulative blocks to use as a revision tool by constructing a model of their first draft. After writing each essay, the students were interviewed about their experiences using the manipulatives and whether they found the tool helpful to their writing process. Observation notes from the teacher, also this researcher, further adds to the body of data to determine whether manipulatives are a valuable tool for adolescent writers, specifically when writing academic essays. Comparing the essay scores, along with the interview data and

observational notes, presents a multi-faceted picture of how the students responded to the manipulative cubes as they drafted and revised their writing.

Significance of Research

This research delves into whether hands-on learning methods like manipulatives can benefit adolescent writers. The act of writing, of forming thoughts into words and communicating those words in a clear, concise, and organized way, can be difficult for people to execute successfully. Concrete objects may help bring abstract concepts like "paragraph structure," "connecting ideas," and "explaining evidence" into a more tangible realm. If this research finds that manipulatives like colored linking blocks have a positive impact on student academic writing, it could benefit middle grades writing teachers who may be struggling to find a way to support their adolescent students. Teachers using traditional, language-based methods may see the value of introducing kinesthetic elements into their instruction.

Summary of Chapter

This study investigated the potential benefits of manipulatives when used as a learning tool for writing instruction. The research question is "how do manipulatives impact middle school students in revising argumentative writing?" The sub question for this study is "how can manipulatives benefit students with unique learning needs at the revision stage of the writing process?" After reviewing the existing literature, there is a need for empirical data to describe the ways manipulatives can be a learning tool in writing.

The study used mixed-methods research to collect qualitative and quantitative data. A pre-assessment, practice assessment, and post-assessment written essay were collected from each participant and scored using the same rubric to measure writing achievement and growth. Interviews with the participants were collected following each assessment to gain insight into the

students' experiences with using the manipulatives in the writing process. The data was analyzed to determine whether students found the manipulatives to be a helpful learning tool and whether their perceptions of the manipulatives indicated growth in writing ability as measured by the rubric scores. The implications of the findings and results are subsequently discussed, and the educational value of this study is communicated. Chapter two will review the existing literature in this area to establish background for this study.

Definitions

Adolescents: Defined in *This We Believe* (2010) as children 10-15 years of age.

California ELA Standards: California adopted the Common Core Standards in English Language Arts in 2011 with 15% additions.

Kinesthetic: Refers to the sense mediated by the muscles and stimulated by the sense of touch as well as body movement.

Legos: A construction toy consisting of colored interlocking building blocks.

Manipulatives: Any tactile object that appeals to several senses and can be touched, moved, or arranged to represent an idea.

Modalities: Sensory channels or pathways through which learners receive and process information.

Movement: Movement of the body or limbs through space, including physical activities such as walking, running, or dancing.

Multiple Intelligence Theory (MI Theory): A theory posited by Howard Gardner that people possess varying degrees of eight or more different intelligences. The original eight intelligences stated by Gardner are: musical-rhythmic and harmonic, visual-spatial, verbal-linguistic, logical-mathematical, bodily-kinesthetic, interpersonal, intrapersonal, and naturalistic.

Specific Learning Disability: A disorder in one or more of the basic psychological processes

involved in understanding or in using language, spoken or written, that may manifest itself in the

imperfect ability to listen, think, speak, read, write, spell or do mathematical calculations,

including conditions such as perceptual disabilities, brain injury, minimal brain dysfunction,

dyslexia, and developmental aphasia.

Tinkertoys: A construction toy consisting of rods and connectors.

Traditional: Refers to a style of teaching that consists primarily of lecture and word-based

instruction with students remaining passive throughout the lesson.

Writing Process: A pedagogical practice that focuses on writing as a multi-stage process

including brainstorming, organizing, drafting, revising, and publishing.

Chapter Two: Literature Review

The theory of kinesthetic learning and using manipulatives is explored across many content areas. Unfortunately, the use of these tools in the writing process remains largely unexplored. This study addresses the research question "how can manipulatives benefit middle school students in revising argumentative writing?" The sub question for this study is "how can manipulatives help students with unique learning needs at the revision stage of the writing process?" In an effort to explore how manipulatives affect the learning environment, specifically in writing, several themes will be discussed in this chapter.

The first theme of this literature review concerns how the kinesthetic element is often absent in education practice and gives an overview of research on the successful use of manipulatives in math and science classrooms. The next theme discussed will give background on the teaching of writing as a process and how middle school students respond to this theory. The third theme in this chapter delves into research on adolescent brain development and how manipulatives can benefit their learning. The fourth and final theme will address writing challenges for students who have learning disabilities, are English learners, or have other unique learning needs and the ways that kinesthetic learning strategies have been shown to help improve their writing skills. By exploring the existing research on these topics, the connections between kinesthetic learning, adolescent development, and writing instruction will be made apparent and an understanding of how manipulatives have the potential to help middle school students in writing classrooms is gained.

The Kinesthetic Element and Learning

The theory of multiple intelligences and learning styles, the preferences of kinesthetic learners, and the impact of learning style instruction on students must be addressed in order to

build understanding of how kinesthetic learners are underprivileged in writing classrooms

(Wilkins, 1995). The idea that people possess varying degrees of intelligence is a theory

popularized in Gardner's (1983) book *Frames of Mind*. His Theory of Multiple Intelligences

challenged the idea of a single human intelligence that could be measured on a standard IQ test.

The author proposed that people possess different amounts of intelligence in eight original

categories: linguistic, logical-mathematical, spatial, bodily-kinesthetic, musical, interpersonal,

intrapersonal, and naturalist (Gardner, 1999), an idea that influences education by encouraging

teachers to see their students, especially those diagnosed with learning disabilities or behavioral

disorders, as possessing unique intelligences that were not being stimulated in the traditional

classroom. By Gardner's definition, bodily-kinesthetic learners acquire intelligence through

hands-on activity, and their minds learn best through movement and tactile stimulation. Students

who are kinesthetic learners will often disengage during instruction delivered through only visual

or auditory means (Armstrong, 2009). When planning instruction, keeping Gardner's

intelligences in mind will help teachers reach more of their students and engage them in learning.

Dweck's research on student perception and motivation complements the conversation of

multiple intelligences by suggesting that students either perceive those intelligences as fixed,

without the possibility of improvement, or as something that can change for the better. Dweck

points out that student self-perception of their intelligence contributes to their motivation when

confronted with challenges. If Gardner's kinesthetic learners are being left out of traditional

classroom instruction (Wilkins, 1995), they may then experience a decline in motivation because

they perceive tasks as too challenging. Adapting instruction to encompass a variety of learners

could, then, help with student motivation and engagement in the classroom (Dweck, Goodstein,

Glaser, & Takanishi, 1986).

Manipulatives in Math and Science

One learning tool that has been proven to motivate kinesthetic learners and aid in understanding, particularly in the math classroom, are manipulatives (Cain-Caston, 1996; Garrity, 1998; Hinzman, 1997; Lindroth, 2005; Munger, 2007; Sherman & Bisanz, 2009; Sowell, 1989; Suydam & Higgins, 1977). Consisting of tactile objects that can be moved, touched, and handled (Kennedy, 1986), manipulatives provide an engaging way for students to interact with abstract mathematical concepts.

Teaching with manipulatives involves careful selection of appropriate objects for the concept, an awareness of the students' developmental stage, and opportunity for free exploration with the manipulatives to foster inquiry (Seefeldt & Wasik, 2006; Smith, 2009). While manipulatives can be an asset to the math curriculum, there needs to be a strong connection between the concepts being taught and object representation (Smith, 2009). If the manipulatives cannot be correlated directly to the math, then they cease to be helpful to students and can become an element of confusion or frustration. When manipulatives are used appropriately to provide concrete examples to abstract math concepts, students can benefit from moving, building, and working with the tactile objects (Munger, 2007).

<center>**The Writing Process in the Middle School Classroom**</center>

Just as math content includes abstract concepts regarding number relationships, the writing classroom necessitates that students gain a conceptual understanding of the ways ideas can be presented in writing across different genres. The craft of writing itself is challenging, and though formulas for paragraph and essay structure exist, fostering student writing must go beyond prescriptive methods (Wiley, 2000). The theory of teaching writing as a recursive process, however, is a basic method that can help students refine their writing without

prescribing a specific formula. In the writing process, students go through stages of

brainstorming, prewriting, drafting, sharing, revision, editing, and publishing in order to take an

idea to fruition as a polished product. This process encourages students to revisit and refine their

work as they go, interacting often with others who read their writing, which is where the true

learning takes place (Maimon, 1988).

Initial writing process theory challenged the traditional idea that writing is a formulaic

exercise and product-driven activity, in which the emphasis is proper grammar and the writing

takes place in the same order it appears to the reader (Maimon, 1988). Education began to

change in the early 1970s with theorists such as Donald Murray and Peter Elbow, who argued

that writing should be taught as a process of discovering and playing with language (Ladd,

2008). Their initial discourse on the topic spurred a movement of writing process pedagogy that

continued to be re-shaped and critiqued in subsequent years. By the 1980s, writing teachers

seemed to be divided between those who sided with Murray and Elbow's concept of writing as

disorganized, playful, and messy, and those who saw Murray and Elbow's ideas as an affront to

the rules and conventions of writing and grammar (Ladd, 2008).

The writing process, as it has come to be known, is a recursive one. This definition means

that students may revisit any stage as necessary, and the writing often takes place out of order

than it appears in its final form (Maimon, 1988). The writing process begins with a

brainstorming, planning and prewriting stage. Here, the writer generates ideas for the writing,

experiments, and charts a course for what will be written in the draft. During the drafting stage,

the writer produces the words, sentences, and paragraphs that communicate ideas. Once an initial

draft is taking shape, the writer may share the piece with others, such as peers or the teacher, to

gather feedback and assess whether what has been written is saying what the writer wants to

communicate. In the revision stage, the writer elaborates, shortens, removes, replaces, and

reorganizes the writing with the aim of improving its various aspects. The editing stage is when

the writer checks for the correctness of conventions, and then finally publishes the writing by

producing a polished draft of the writing (Maimon, 1988). These steps in the writing process are

not necessarily performed in a linear fashion from beginning to end, but may be revisited

continuously until the writer is satisfied with the finished piece.

The writing process can be daunting, and due to time constraints of school day schedules,

it can be difficult for teachers and students to devote the necessary time and attention to each

stage. However, the stages are integral to developing students into engaged, eager writers

(Culham, 2014), and they are opportunities to engage students who possess a plethora of learning

styles and intelligences. The next two sections will discuss how multiple intelligence theory and

writing process pedagogy can be used to develop the writing skills of kinesthetic learners in the

middle school grades.

Adolescent Brain Development and the Benefits of Manipulatives

While never fully supported by empirical research (Stahl, 1999), Gardner's theory of

multiple intelligences still holds traction in the minds of many educators. The idea that students

may need multiple approaches to a lesson in a variety of modalities has become a tenet of "good

teaching" that many educators accept to be true (Darling-Hammond; 2010, Hattie, 2011;

Tomlinson, 2014). Indeed, using body motions, song lyrics, or graphic representations to

communicate a concept are all familiar aspects of teaching strategies commonly seen in lower

grade levels. However, many of these ideas are lost by the time a student enters middle school

(National Middle School Association, 2010). In the 6th, 7th, and 8th grades, many students leave

the self-contained elementary environment and find themselves immersed in situations that

require them to sit for extended periods of time and process information primarily through

listening or reading (Klem & Connell, 2004; Marks, 2000). The elements of music and

movement that were readily accessed in elementary grades are infrequent in the middle grades as

students prepare themselves for the rigors of high school academics.

      Adolescence changes the brain in ways that cause moments of extreme activity and

extreme lethargy (National Middle School Association, 2010). Decision-making processes are, in

many ways, like that of a young child as they once again test boundaries and experiment with

consequences for their actions (Chambers & Chamberlin, 1991). Psychological changes help

adolescents form individual identity, self-consciousness, and relate to others around them

(Blakemore, 2008). In every way, middle students are still growing and learning, necessitating

the use of multiple modalities and approaches to learning in the many lessons they encounter

throughout the day (Salyers & McKee, n.d.).

      Multiple modality instruction is necessary in the middle school classroom, and Gardner's

bodily-kinesthetic intelligence, which uses body movement and tactile objects to process

information, has valuable applications for teaching and learning. The writing classroom,

especially, can benefit from using movement and manipulatives to help students access and

execute the various stages of the writing process. While teachers should avoid labeling students

as certain types of learners (i.e. English Learner or as learner with special needs), that could

potentially limit their academic self-perception, incorporating strategies that stimulate multiple

intelligences into a process that is primarily and traditionally visual will help students succeed in

producing clear, coherent, and college-ready writing. (Rhodes, 2015).

Writing Challenges for Students with Unique Learning Needs

Students with learning disabilities ranging from Attention Deficit Disorder (ADD) and

Attention Deficit Hyperactive Disorder (ADHD) to specific learning disabilities have been

shown to struggle with writing and the writing process (De la Paz, 2001; Englert & Raphael,

1988; McCutchen, 1988; Thomas, Englert & Gregg, 1987). Planning, especially, is difficult for

these students (Graham & Harris, 1996; Thomas, Englert, & Gregg, 1987). The typical essay for

a student with learning disabilities will likely draw upon the student's background knowledge

and culminate in a string of ideas in which each preceding idea generates the next (De la Paz,

2001). This approach results in a paper that may be off-topic, disorganized, and pay little

attention to the audience (Graham & Harris, 2000).

The focus on problem-solving and critical thinking with the Common Core standards can

be stimulated by using constructive manipulatives to build models of abstract concepts similar to

those used in math classrooms. Often, when faced with the task of constructing a three-

dimensional representation of an idea, a student will discover new aspects of the concept or

develop insights throughout the model-building process. The use of manipulatives is a

kinesthetic process that harnesses multiple reasoning skills to form a coherent representation of

what is being communicated. For a student with a learning disability who may struggle with the

writing process, building a model of the writing may be a valuable tool to help students find

ways to organize and communicate information before drafting a paper. When looking at

revisions, the student may also see where thoughts have become disjointed when asked to

reconstruct a model of the paper (Klein & Hecker, 1994). Motion, another kinesthetic process, is

an effective tool for creating concrete symbols of intangible ideas. Body movement also benefits

the mental processes within the brain. When the body or limbs are moving, the mind is also

active (Stephenson & Hochstetler, 2002).

Language and words are, for many students, a mode of communication that is still in development and may feel out of reach. Teachers who expose students to multiple ways to turn ideas into language—shapes, colors, physical movement, location, and size all can help unlock a struggling student's writing capability. If given the opportunity to build a three-dimensional model of their writing, students can see their writing's organization made visible in a new way (Stephenson & Hochstetler, 2002). Shor (1980) in work regarding Paulo Freire's pedagogical theories of liberating the traditional classroom, describes a variety of multisensory strategies that can help students conceptualize and grasp abstract concepts. While Shor focused primarily on social justice and challenging social conditions in education, an important aspect in education was overlooked: society's bias toward certain ways of knowing and learning (Dunn, 2001). In a critique of Shor, Dunn asserts that word-based teaching is privileged over other ways of knowing, including kinesthetic, due to the preferences of teachers (Dunn, 2001). If writing teachers use primarily words to model and demonstrate the writing process, they overlook a significant portion of their student population who may require alternate methods of demonstrating information to aid in processing it. Teachers need to present content in multiple formats while giving students a variety of strategies to engage with the content in their own ways.

Kinesthetic strategies activate a non-linguistic aspect of the writing process, which is traditionally word-based and can challenge linguistically gifted students while giving confidence to students who struggle with language. Utilizing other areas of a student's intellect can help them to develop new ideas and insights into their writing and lead to writing that is more structured and organized than the student may have achieved without the strategies (Dunn, 2001). Using a variety of strategies helps challenge some students some of the time while

increasing the confidence of others, and vice versa for the rest of the students the rest of the time. This allows a teacher to continually use rigorous methods that engage and challenge students' minds, showing new ways of processing what concepts of writing have been taught.

When incorporating multi-modal strategies to aid the writing process can benefit students, a variety of learning tools becomes available for those who may not understand the process of writing using words alone.

Conclusion

The research outlined in this literature review provides background for understanding the significance of this study. Manipulatives have been shown to help students improve their understanding of abstract mathematical concepts, and connections have been made to their potential benefit in writing. Due to the limited research on manipulatives in the writing classroom, especially using adolescent participants, this study seeks to contribute mixed-methods research into how manipulatives may help students with academic writing skills in a seventh-grade writing classroom. An additional aspect of exploration in this study is whether students with learning disabilities respond positively to the manipulatives and show growth in their writing abilities from a pre-assessment to a summative assessment. The research methods for this study are described in more detail in chapter three.

Chapter Three: Methodology

As highlighted in the literature reviewed for this study, traditional ways of teaching writing may not hold the attention of adolescent students who need movement and hands-on experiences to stay engaged in learning. The existing research shows that when kinesthetic methods are introduced to writing instruction, many students experience new ways of thinking about what they are writing or how to revise what they have written (Dunn, 2001; Klein & Hecker, 1994). Very few studies, however, have documented empirical data to clearly show how kinesthetic instruction improves academic writing skills.

This study explored the research question "how do manipulatives impact middle school students in revising argumentative writing?" The sub question for this study is "how can manipulatives benefit students with unique learning needs at the revision stage of the writing process?" The research design used a mixed method approach consisting of quantitative and qualitative data. It is a good match for this study as it offers the opportunity to collect rubric scores on writing assessments as well as gain insight into the participants' individual experiences with the manipulatives during the writing process.

Quantitative data for this study consisted of documented essay scores using a district designed rubric from a pre-assessment essay, practice assessment essay, and post-assessment essay throughout the fall 2016 semester of a seventh-grade language arts class. Qualitative data included interviews between this researcher and the student participants, which were recorded using Google Voice to transcribe the responses in a Google Doc document and kept private to this researcher. No names or personal information were retained from the interviews. The open-ended questions encouraged them to elaborate on how the instructional methods for each essay, especially the use of manipulatives, helped them or hindered them while writing the essays. This

research was collected in an effort to provide data on how adolescent students respond to hands-on learning methods when engaged in the writing process.

The data was gathered using a convenience population of seventh grade students from a small, rural Southern California middle school. Sixty-two participants from language arts classes taught by this researcher were included in the data collection. Data was collected in two intervals, in which students spent two weeks writing each essay and were interviewed after they had begun drafting and used the manipulatives to build models of what they had written. Quantitative data analysis included comparing the essay score results from the pre-assessment to the post-assessment scores in order to determine growth. Qualitative data analysis included reviewing the student interview feedback to determine common themes and examine potential relationships between students who demonstrated growth with the essay scores and who responded positively to the manipulatives.

Procedures

The participants completed a semester-long study that took place during the Fall 2016 semester of seventh grade language arts, a class focused on writing and reading skills. Throughout the semester, the students engaged in both informal and formal writing tasks such as journal entries, quick writes, and formal essays while this researcher used a variety of instructional methods to help refine their academic writing. This research focused on Hecker's (1997) ideas of introducing toys and manipulatives to build conceptual understanding of the written draft, while including language-based methods like exemplar texts, notes, rubrics, and outlines. It offered students a chance to participate in both kinesthetic and language-based instruction, and interviews helped uncover their experiences regarding which methods seemed more helpful with their writing development.

This researcher, as the language arts teacher for the participants, gave a pre-assessment essay and a post-assessment argumentative essay. The assessments were given at the beginning and the end of the first semester of the school year. Both assessments were scored using the same district rubric for the argumentative writing genre. During the development of the practice assessment and the post-assessment essays, the participants were able to use manipulatives, in the form of interlocking colored cubes, to build models of their first drafts. After finishing each essay, the participants were interviewed about their experiences with the manipulatives and whether or not they found them a useful tool for their individual writing process.

Setting

The middle school where this research took place is part of a small rural district in Southern California surrounded by agriculture. The school has a student body of approximately 600 children across sixth, seventh, and eighth grades. The school includes diverse socioeconomic and cultural representations. Students come from a mixture of upper middle class, middle class, working class, and low-income populations. The student population is composed of students from the nearby Indian reservation, the migrant farming community, and socioeconomically diverse neighborhoods. Twenty-three percent of the students are from low-income households, and 14% are from military-connected families. The middle school staff includes a mixture of long-term and newer teachers. The district's goal is to ensure target populations experience growth. The district also has a focus on literacy, manifested through the inclusion of reading and writing in each core curriculum class.

Participants

The participants for this study are a convenience sample of 62 seventh grade students in their English classes. This researcher is the English teacher for all participants. The sample

includes students of various academic levels as determined by the most recent data from the

district assessment tool. Reading levels determined by this assessment range from second grade

to twelfth grade level. Approximately 25% of the participants include students receiving special

education services or English language support through a push-in model. The rest of the

participants are general education students. The participants are aged 12 to 13 in the first

semester of seventh grade. The majority are White, with approximately 40% representing

Hispanic or Native American backgrounds. Thirty-seven of the participants were female, and 25

were male.

<div align="center">**Methodology**</div>

Data Collection

This study used mixed-methods research tools to collect both quantitative and qualitative

data for analysis. The quantitative instrument was a rubric (see Appendix A) used to assess the

quality of students' argumentative writing. The rubric was a four-point district writing rubric that

examined the students' ability to make a claim and trace it throughout the essay, use evidence

from sources effectively, elaborate and connect the evidence to their reasoning, use an academic

tone, and use grammar and spelling conventions correctly.

Scores using this rubric were collected from three argumentative essays the student

participants wrote from September to December during the Fall 2016 semester of seventh grade.

Throughout the duration of this study, the participants experienced using different

learning tools to assist with the development of their argumentative essays. Some of these tools

were language-based, such as a graphic organizer that used a nine-square table to help the writer

gather and discuss evidence from the text (see Appendix B). The kinesthetic strategy included in

this research involved using colored linking cubes to create a three-dimensional model of the

students' essays.

Qualitative data was collected through one-on-one interviews this researcher conducted

with each participant. The participants gave assent at each interview. Prior to the interviews,

parents were notified and had the option to opt their child out of data collection. The interviews

were recorded using Google Voice, which transcribed the participants' responses to gather the

data in a Google Doc document. The students were labeled with a number, and no names or

personal data were documented. The interviews were kept confidential and used only for the

purposes of this research. After the pre-assessment and the post-assessment were turned in, this

researcher interviewed each participant. This was done to gather information on whether the

students found the strategies presented to them helpful to their writing process. The interview

questions were:

1. Is it okay to record this interview to use in my research?

2. What strategies have you used in our exploration of different writing strategies?

3. Why did you choose to use those strategies?

4. What writing goals were you working on when you used those strategies?

5. Did you think the strategies you used were helpful or unhelpful in achieving your goals?

6. Why do you think they helped you or did not help you?

7. What are your next steps for crafting your piece of writing?

8. Do you think you will continue to use these strategies? Why/why not?

Additional qualitative data was collected through observation notes this researcher took

while observing students using the different strategies presented to them. For example,

participants were asked to describe the models they were building and how they were using the

manipulatives. Throughout the two weeks of essay preparation and writing that occurred for each

of the two assessed essays, the participants were encouraged to leave feedback comments on the

classroom whiteboard. These anonymous comments were included in the research notes.

Figure 1. Participants using manipulatives.

Timeline

This research took place over the course of about three months during the first semester

of the 2016-17 school year. From September to December, the participants wrote three

argumentative essays which were scored using the same rubric for each. Additionally, the

participants each responded to interview questions during one-on-one discussions with this

researcher for the second and third essays. The interview questions were the same each time, and

inquired whether the students found the tools they used to craft their essays helpful to their

writing processes. Throughout the process, this researcher kept informal observation notes on

how the students responded to the strategies presented to them. Student behavior, observed time

on task, receptiveness, and attitude while using the tools were some of the things noted in this
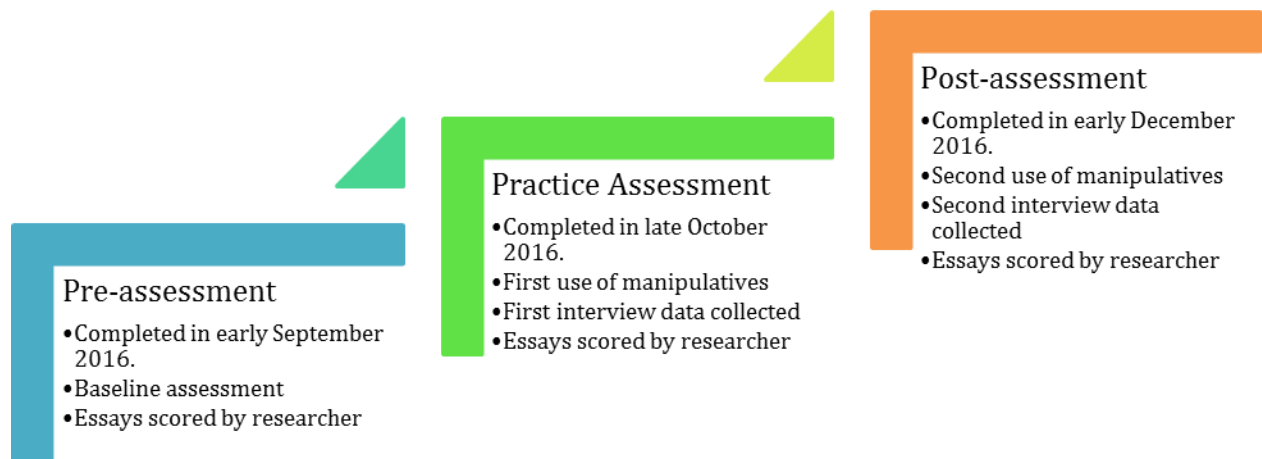
data.

Pre-assessment
- Completed in early September 2016.
- Baseline assessment
- Essays scored by researcher

Practice Assessment
- Completed in late October 2016.
- First use of manipulatives
- First interview data collected
- Essays scored by researcher

Post-assessment
- Completed in early December 2016.
- Second use of manipulatives
- Second interview data collected
- Essays scored by researcher

Figure 2. Timeline.

Data Analysis

This research sought to add data-driven evidence to the existing body of research on whether kinesthetic methods benefit students in writing. This study echoed Hecker's use of hands-on approaches to writing with her students. The methods focused on college-aged students who had learning disabilities, and were presented as a testimonial account of success with using these learning tools. One of the methods used was having students build a model of their writing using Tinkertoys and Legos. This researcher adapted that strategy, using colored connecting blocks for the same purpose. Feedback from rubric scores and student interviews provided mixed-methods data, and it was analyzed by comparing the score data pre-to post and to the student responses in the interviews. Did students see the benefit of using the manipulatives, if they found them beneficial at all? Did their rubric scores from each of the three essays show growth in their academic writing ability? What impact, if any, did this kinesthetic strategy have on their writing? These questions were examined using the data collected throughout this study.

The data were analyzed by compiling the rubric scores for each of the three essays and the interview feedback from each student. The scores were analyzed for overall growth in argumentative writing skills throughout the duration of this study. Interviews were analyzed by identifying how students responded to various writing strategies. Their feedback was categorized as either positive or negative comments from their experience with using manipulatives in the writing process. That data was referenced against the essay scores to see whether students who found the manipulatives helpful also demonstrated growth in their rubric scores.

Summary of Chapter

Mixed-methods research design was used to gather data to learn how kinesthetic instructional strategies, specifically manipulatives, can affect the writing process for middle school students. This was an appropriate design choice for this study as it offered both quantitative and qualitative data for analysis. Rubric scores from a pre-assessment and post-assessment were collected to measure growth in argumentative writing skills. Interview responses were also collected in order to gain insight into the participants' perceptions of the instructional strategies used to teach the writing concepts and foster the stages of the writing process. Teacher observation notes were also included in the data analysis.

The study took place in a small middle school of 600 students, using a convenience sample of 62 of this researcher's seventh grade Language Arts students as participants. Parents were notified that non-personal data would be used for this study, and had the option to opt-out their child from the data collection. The participants also had the option to opt-out of data collection. The data was analyzed by comparing growth in rubric scores on the written assessments to the interview responses to find common themes between academic growth and

the participants' experience with using manipulatives during the writing process. Chapter four

will provide the raw data and an in-depth discussion of the data analysis.

Chapter Four: Data Analysis

This study inquired into the potential benefits of manipulatives when they are used to

help seventh grade students with academic writing. The research question for this study asked,

"How do manipulatives impact middle school students in revising argumentative writing?" It

also explored the sub question for this study: "how can manipulatives benefit students with

unique learning needs at the revision stage of the writing process?" Both quantitative and

qualitative research methods were used to collect data in this mixed-methods study. Quantitative

measures were pre-assessment, practice assessment, and post-assessment essay scores, using the

same district-approved rubric for each and scored by the teacher/researcher. Qualitative measures

were interviews that this researcher conducted with individual participants regarding their

impressions of the manipulatives and other instructional strategies used during the lessons for the

practice assessment and post-assessment essay, as well as observational notes that this researcher

collected during the times when students used the manipulatives. Data was collected from 62

total participants.

This study adds data to the existing literature on manipulatives as a writing tool. The

existing research is primarily testimonial accounts of their successful use with students who have

learning disabilities (Hecker, 1997). In the realm of math and science, there are many studies that

suggest manipulatives are a helpful learning tool for students, as they make abstract concepts

more concrete in their minds (Goldsby, 2009). By using mixed-methods research design, this

study begins to fill a gap where there is currently no empirical data on the ways in which

manipulatives may benefit middle school students in revising writing.

The manipulative tool used in this study were plastic, colorful cubes that could be affixed

to each other on the top, bottom, and sides. The participants explored the use of this manipulative

after their first drafting stage of the writing process for the practice assessment and post-

assessment essays. All three essays focused on argumentative writing. The participants were

prompted to use the manipulative cubes to build a three-dimensional model of their draft,

designing it using any strategy they wished. After using the cubes, the participants were

interviewed regarding whether they found the manipulatives helpful as they prepared to revise.

Since other language-based writing strategies were used alongside the manipulatives, the

participants were also interviewed regarding the helpfulness of the other strategies. Rubric scores

on the participant's' final drafts were compiled and analyzed to see whether the participants

showed growth in the organization of their academic prose. The interviews and observation notes

were analyzed for common themes, and the participants' rubric scores on the pre-assessment,

practice assessment, and post-assessment were analyzed for growth.

This chapter will present the results of the quantitative data and findings of the qualitative

data. A discussion of the data follows the presentation, including interpretations of the results

and findings to determine implications for the educational field and writing instruction, in

particular.

Data Presentation and Analysis

Qualitative Data

This section includes a narrative analysis of the findings using grounded theory to draw

conclusions based on similar themes in the interviews and observation notes.

The following graphs illustrate the feedback given by the participants regarding the use

of the manipulative cubes after completing a first draft of their argumentative essays. The data

illustrated in these graphs was collected through interviews between the researcher and

individual students. A total of 62 participants provided feedback after both the practice

assessment essay and the post-assessment essay. The manipulatives were not used during the

pre-assessment essay to give a baseline for comparison. Therefore, no interview data was

collected for the pre-assessment.

Chart 1 illustrates all 62 participants' interview feedback from the practice assessment

and the post-assessment, broken down to show whether they thought the manipulatives were a

helpful or unhelpful tool at the revision stage of the writing process. The Y axis displays the

number of participants who responded for both feedback categories: "helpful" and "unhelpful."

The dark blue bars show how many participants thought the manipulatives were helpful. The

orange bars show how many participants thought the manipulatives were unhelpful. The data are

separated into two areas along the X axis, reflecting the participants' first experience with the

manipulatives during the practice assessment, and their second experience during the post-
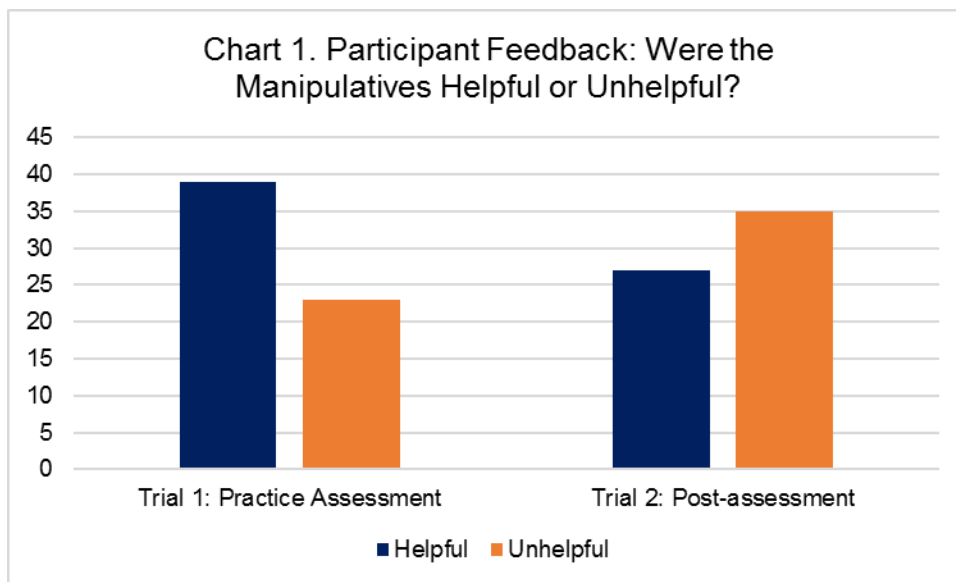
assessment.

Chart 1. Participant Feedback: Were the Manipulatives Helpful or Unhelpful?

By measuring the interview feedback in this way, insight is gained into the way the

participants perceived the manipulatives as a helpful or unhelpful writing strategy. In the first

trial, the practice assessment, 39 participants described the manipulatives as helpful to their

writing process at the revision stage. 23 participants said that the manipulatives were unhelpful.

In the second trial, the post-assessment, 27 participants described the manipulatives as helpful

while 35 described them as unhelpful. This data reveals that the first experience with the

manipulatives yielded a more positive perception of the manipulatives as a helpful tool for

revising writing, making "helpful" the more popular comment. The increase in negative

perception in the second trial is interesting to see, as the participants' second experience with the

manipulatives shows that more students found them to be unhelpful than helpful.

In their interviews, the participants elaborated on their experiences with using the

manipulatives. The participant feedback that was coded as "helpful" in the data for both

interviews included comments like, "It was helpful to see a three-dimensional model since I

could see my writing in a different way and interact with it," "The manipulatives showed me

what I was missing so that I could add it in on my next draft," and, "They were helpful because I

could see how I had organized my thoughts and where I needed to improve." While the

participants were told that the manipulatives could be used to help with organization, the

researcher did not dictate a particular method for building the model or emphasize a specific

benefit to organizing writing. It is interesting to note, then, that while the participants' comments

were not explicitly guided towards commenting on organization, fourteen of the 39 participants

in the practice assessment interviews gave feedback related to organization. These participants

made comments saying the manipulatives aided in things like, "seeing the structure of

paragraphs," "visualizing the order of ideas," or, "balancing the order of paragraphs." In the

post-assessment interviews, thirteen of the 27 participants who described the manipulatives as

"helpful" mentioned organization benefits such as, "The manipulatives showed me that every

paragraph needs examples for support," and, "The manipulatives were useful for seeing what I needed to change in my paragraph structure."

Feedback from the practice assessment interviews categorized under "unhelpful" revealed that the participants who had a negative experience with the manipulatives in the practice assessment interviews were often confused about the purpose of the manipulatives or how to use them, and therefore did not see the value of their use. Fourteen of the 23 participants who described the manipulatives as "unhelpful" elaborated to say that the manipulatives were "confusing," or that that they "didn't understand" them. Other "unhelpful" comments from this interview included commonalities such as, "The manipulatives were too distracting," or, "the manipulatives took away from writing time." These same themes reoccurred in the post-assessment interviews. Seven of the 35 participants who described the manipulatives as "unhelpful" in the post-assessment interview said they were "confusing" or that they "didn't understand" the purpose of using them. Other common comments included feeling that the manipulatives were a "waste of time", "weren't necessary", or were "too much of a distraction." An additional theme to note in this category is that several participants thought the manipulatives could have been used at a different stage in the writing process for more benefit, since they weren't helpful for them at the revision stage. Several participants also felt that the manipulatives could have been replaced with a different strategy to stimulate revision, such as using different colored pens to annotate the first draft instead of using the manipulatives.

Charts 2 and 3 illustrate the differences in feedback between selected participant populations: males, females, special education, and English learners. Males are compared to females, and participants who are special education are compared to those who are English learners. Data from both interviews are shown in three separate categories: participants who

thought the manipulatives were helpful during both trials (the practice assessment and post-assessment essays), participants who thought the manipulatives were helpful in the first trial but not the second trial, and participants who thought the manipulatives were not helpful in neither the first trial nor the second trial.
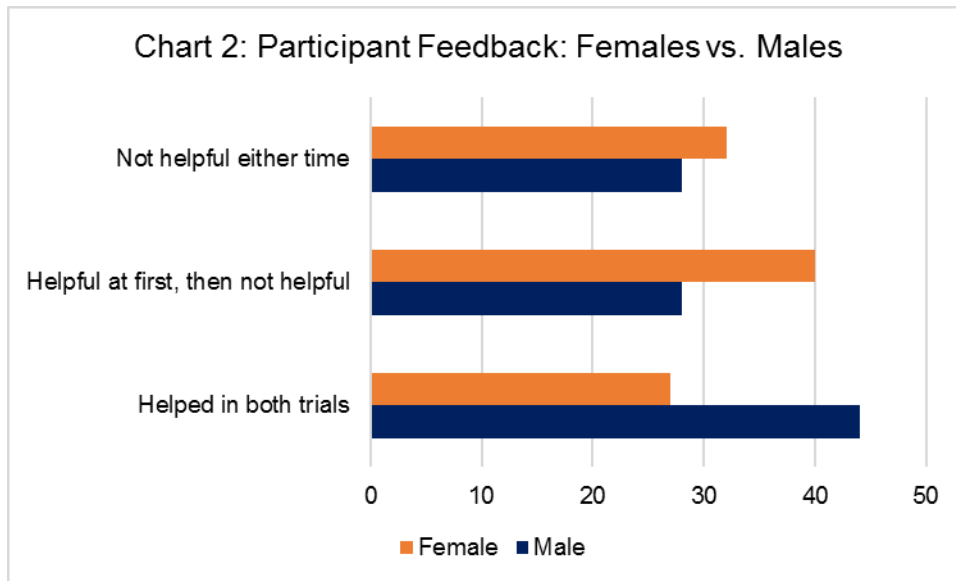

Chart 2. Participant Feedback: Females vs. Males.

Chart 2 measures the participant responses in percentages because there is a gender imbalance in the participant population: 37 females and 25 males. Of the 37 females who participated in both interviews, 27% thought the manipulatives were helpful in both trials. Of the 25 male participants, 44% thought the manipulatives were helpful in both trials. This category revealed the most significant difference between females and males, as 17% more males considered the manipulatives a helpful writing tool both times they were used. The data also shows that 40% of female participants thought the manipulatives were a helpful tool in the first trial, but after the second trial thought that they were unhelpful. This is a greater percentage than the males; 28% thought the manipulatives were helpful at first, then unhelpful. There were also participants who said the manipulatives were not helpful in either trial. These responses were

much closer in numbers, with 32% of females and 28% of males in this category. By comparing

interview data between females and males, Chart 2 suggests that males may have benefited

slightly more from the manipulatives than females. Chart 3 examines the same interview data,

but this time compares special education (SPED) participants with English learner (EL)

participants. Again, the quantity of responses in each category is displayed as a percentage since

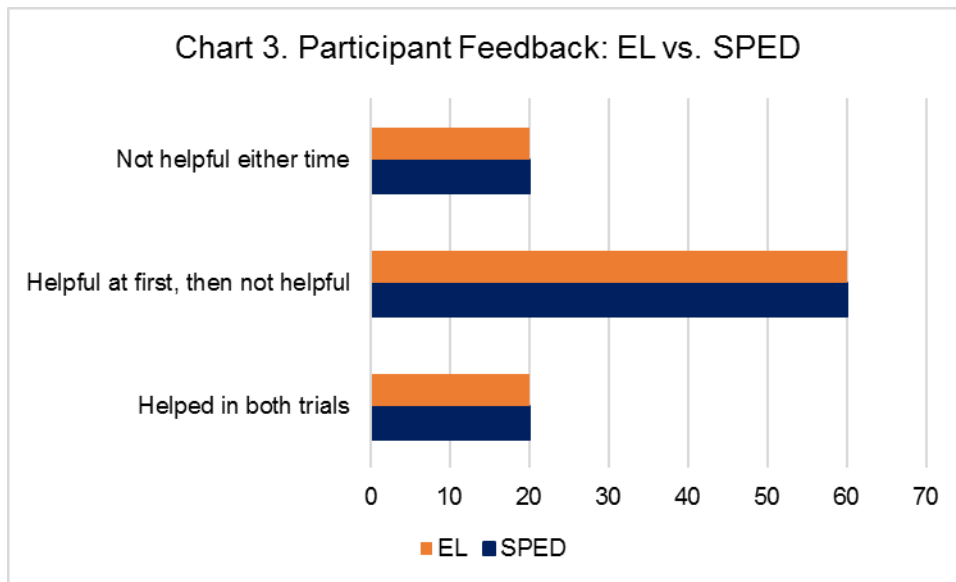there are ten SPED participants and five EL participants.

Chart 3. Participant Feedback: EL vs. SPED.

Interestingly, Chart 3 illustrates that equal percentages of SPED and EL populations gave

the same responses in all three categories. Twenty percent of both populations thought that the

manipulatives were helpful in both trials, but 20% of both populations also thought that the

manipulatives were unhelpful in both trials. The greatest percentage of participants in both SPED

and EL populations felt that the manipulatives were helpful in the first trial, but ceased to be

helpful in the second trial. Sixty percent of responses fell into this category for both populations.

The data presented in Chart 3 indicates that SPED and EL populations responded to the use of

manipulatives as a writing tool in the exact same way.

The informal notes that this researcher kept while observing the participants aligns with the findings of the qualitative data. This researcher, who was also the teacher for the participants in this study, collected informal observation notes without identifying the participants regarding how they reacted to and used the manipulatives during the practice assessment and post-assessment essays. The time duration that the participants used the manipulatives was approximately 30 minutes for each essay. The participants wrote a complete first draft, and then were permitted to use the manipulatives.

When the participants had their first encounter with the manipulatives after writing their first drafts, they were excited to see something new and were curious about the plastic, colorful cubes. The first instructions that the participants received for the manipulatives were to "build a three-dimensional model" of their draft. This directive was purposefully vague so that this researcher could observe the different ways that the participants interpreted it, as well as the organic creativity that the participants would use to build their models. However, the lack of clarity for the participants resulted in confusion. As the participants tentatively started linking cubes together, common questions included, "What are we doing, exactly?" and, "What are the cubes for, again?" After allowing for a few minutes of this confused state, this researcher provided some suggestions to help the participants use the manipulatives purposefully: "The colors can represent different parts of your paragraphs, like your claims, examples, and where you explain your reasoning. The way you connect the cubes together can show how your thoughts are ordered, and help you to identify where you need to add or subtract ideas."

After receiving this clarification, the participants seemingly settled into building with less confusion than before. The models began taking shape, some with long columns of cubes with blocks of the same colors. Other models branched out to the sides, with cubes linked together in

short rows. One model resembled a table, with four "legs" made of short stacks of cubes that

held up a rectangular block of cubes for the "table top". It was interesting to observe that even

though the directions needed to be narrowed down and specified to mitigate confusion, the

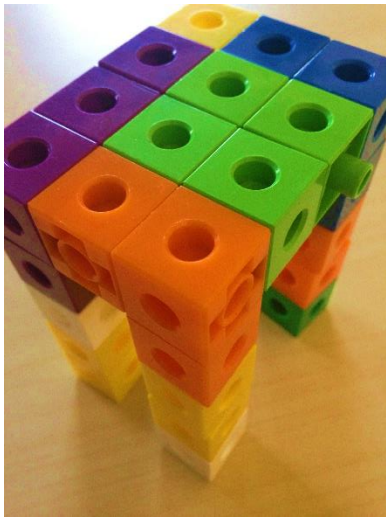participants still produced models that looked diverse.

Figure 3. Model created with manipulatives.

As participants finished their models, the researcher asked several participants to explain

their building strategy and discuss the rationale for color choice and placement of the cubes.

Each participant questioned was able to articulate clear reasoning and had apparently given some

thought to how their model related to the ideas presented in their drafts. "The red cubes in the top

row represent my claim for this paragraph," said one participant, "and the blue cubes are where I

have examples. I was going to use these orange cubes for where I explained my examples, and I

realized that I didn't really have much explanation, so I didn't use very many here. That's

something I will change."

Although most of the participants appeared to be using the cubes with understanding,

others were still confused about the presence of the manipulatives and how they were to use

them. Several participants were playing with the manipulatives in an off-task manner instead of

building a model as instructed. Others sat there continuously putting cubes together and then taking them apart, apparently without a particular rationale for composing the structure. When this researcher questioned these participants about their actions, the common response was "I just don't get it." This researcher then encouraged participants who had completed models to explain them to participants who didn't understand the manipulatives. By the end of the half hour, however, some of the participants still appeared to have a lack of understanding.

In the second experience with the manipulatives, which took place during the post-assessment essay, this researcher gave the same directive to "build a three-dimensional model of your draft" and reminded the participants that color and the way the cubes were linked together could represent elements of their paragraphs, like claims, examples, and explanation. There was less excitement at the onset of this second experience. However, some participants seemed to enjoy setting to the task of building the models. Others appeared bored as they snapped the cubes together and took them apart. Though the participants had thirty minutes to use the manipulatives, many finished quickly and, when prompted, explained them in a hurried way: "This is my claim, this is my evidence, and this is my explanation," said one participant, pointing to color-blocked areas of the model. This researcher noticed that most of the models the participants built during this experience were simpler and boxier than before. A common model style featured short rows of cubes connected at the sides, creating flat, rectangular appearances. There was less diversity than the first time the participants used the manipulatives. Several asked questions like, "Are we going to get any writing time today?" and, "when is the essay due, again?" This researcher observed that although some participants were engaged with the manipulatives, others seemed to want the activity to end quickly so they could move on to revising and finishing their essays.

The findings of the qualitative data will be analyzed further in the discussion section. Along with interview data, this researcher collected score data from three argumentative essays: a pre-assessment, practice assessment, and post-assessment. The charts presented in the following quantitative data section illustrate the results of these essays.

Quantitative Data

This researcher scored each of the three essays the participants completed over the course of this study: the pre-assessment, the practice assessment, and the post-assessment. A district rubric for argumentative writing (see Appendix A) was used to gain rubric scores for each participant's writing skills. The rubric addresses the areas of statement of purpose, organization, development and elaboration of evidence, language and vocabulary, and conventions. The rubric features a four-point scale to help the scorer determine whether the writer's skills are proficient in those areas. The rubric areas for columns "1" and "2" describe non-proficient and almost-proficient skills, respectively. "3" denotes proficient skills, and "4" describes advanced argument writing skills.

Due to the nature of the rubric, the participants' rubric scores sometimes fell between two of the numbers. A system of pluses and minuses helped to determine whether participants were closer to one number or the other. Grade percentages corresponding to the rubric scores were also recorded. This practice is consistent with district grading practices.

The following quantitative data presentation includes scores from the pre-assessment, practice assessment, and post-assessment essays, as well as growth comparisons between selected groups within the total participant population. Some charts show rubric point scores, and others illustrate the data in equivalent percentages for ease of analysis. Scores from the

"Organization" category of the rubric are also isolated and growth comparisons in this section are shown.

The first three charts show the breakdown in overall rubric scores for the pre-assessment (Chart 4), the practice assessment (Chart 5), and the post-assessment (Chart 6).
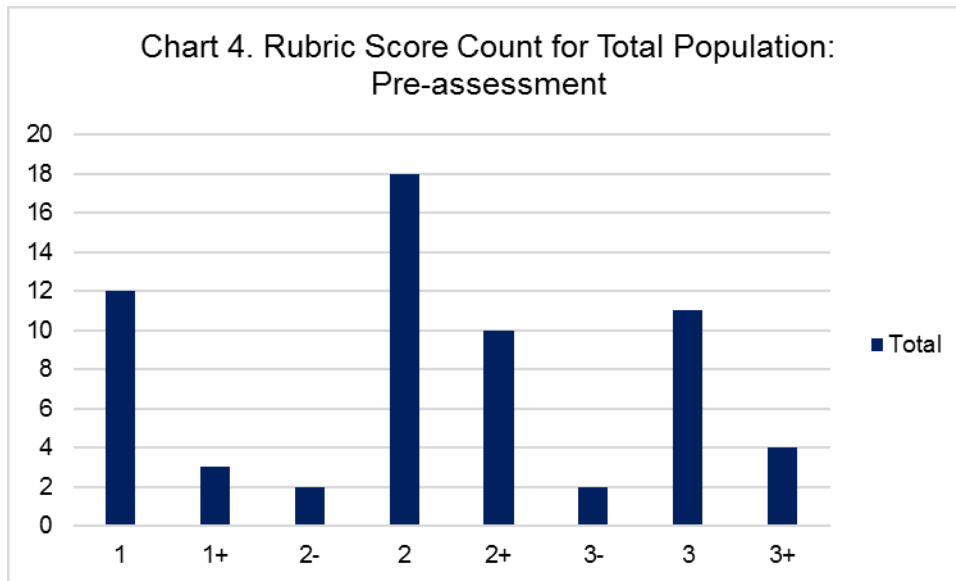

Chart 4. Rubric Score Count for Total Population: Pre-assessment.

Chart 4 displays overall rubric scores from the pre-assessment, separated on the X axis by the rubric score value. The Y axis counts the number of participants in each rubric score value. On this pre-assessment essay, the highest overall score achieved was a 3+, with four participants earning this score. The lowest overall score was a 1, with 12 participants. The rubric score value that the most participants earned was a 2, with 18 participants. The data presented in this chart reveals that on this essay, 45 of the participants earned less than proficient overall rubric scores (below a 3-), while 17 scored proficient or higher (3- and above).

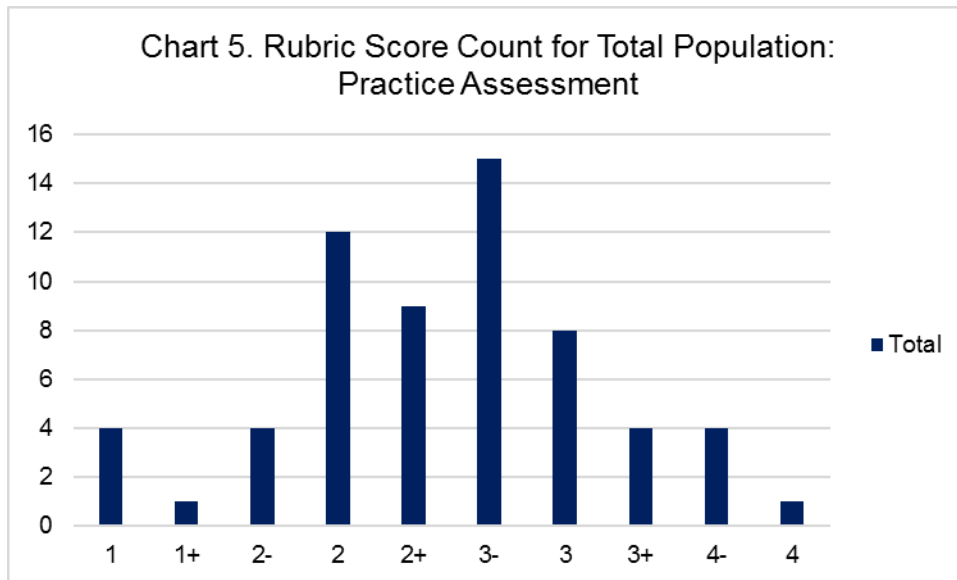Chart 5. Rubric Score Count for Total Population: Practice Assessment.

Chart 5. Rubric Score Count for Total Population: Practice Assessment.

Chart 5 displays overall rubric scores from the practice assessment, separated on the X axis by the rubric score value. The Y axis counts the number of participants in each rubric score value. On this practice assessment essay, the highest overall score achieved was a 4, with one participant earning this score. The lowest overall score was a 1, with four participants. The rubric score value that the most participants earned was a 3-, with 15 participants. The data presented in this chart reveals that on this essay, 26 of the participants earned less than proficient overall rubric scores (below a 3-), while 36 scored proficient or higher (3- and above).
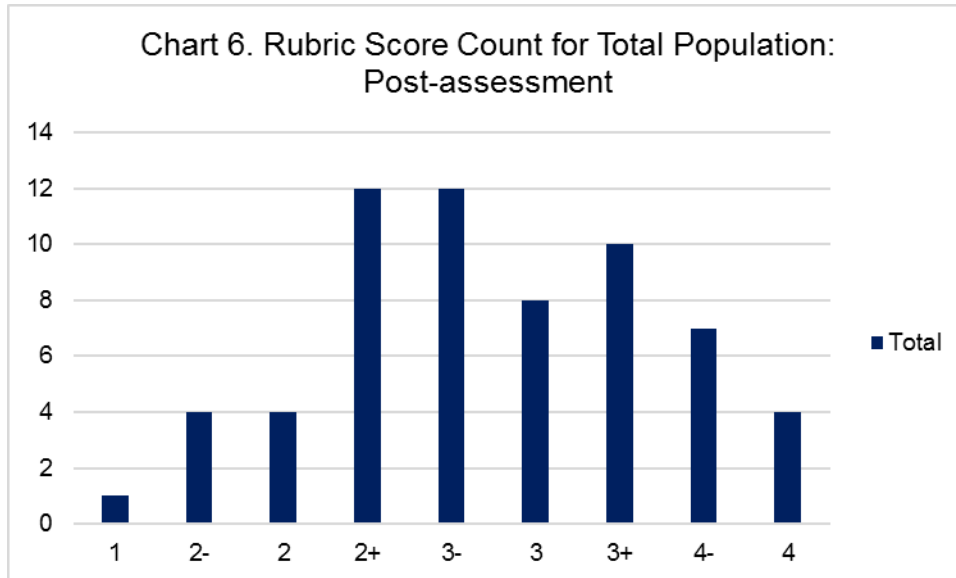
Chart 6. Rubric Score Count for Total Population: Post-assessment.

Chart 6 displays overall rubric scores from the post-assessment, separated on the X axis by the rubric score value. The Y axis counts the number of participants in each rubric score value. On this post-assessment essay, the highest overall score achieved was a 4, with four participants earning this score. The lowest overall score was a 1, with one participant. The rubric score value that the most participants earned was tied between 2+ and 3-, with 12 participants in each. The data presented in this chart reveals that on this essay, 21 of the participants earned less than proficient scores (below a 3-), while 41 scored proficient or higher (3- and above).

In Chart 7, this same data is represented in one clustered bar graph.
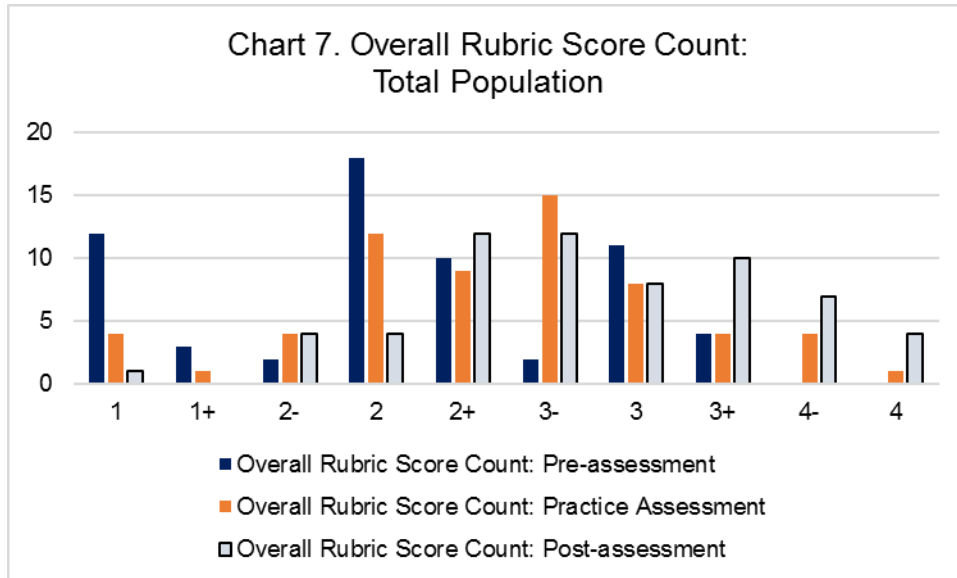
Chart 7. Overall Rubric Score Count: Total Population.

The dark blue bars show the overall rubric score count for the pre-assessment, the orange bars represent the overall rubric score count for the practice assessment, and the light blue bars display the overall rubric score count for the post-assessment. Viewing the overall rubric scores side by side shows the progression of scores as the participants' argument writing skills improved from essay to essay.

Chart 8 shows the number of participants whose overall rubric scores were either "below proficient" or "proficient or above" for the pre-assessment, practice assessment, and post-assessment to further illustrate the participants' overall growth in argument writing skills, as measured by the rubric criteria.

Chart 8. Overall Rubric Score Growth: Total Population
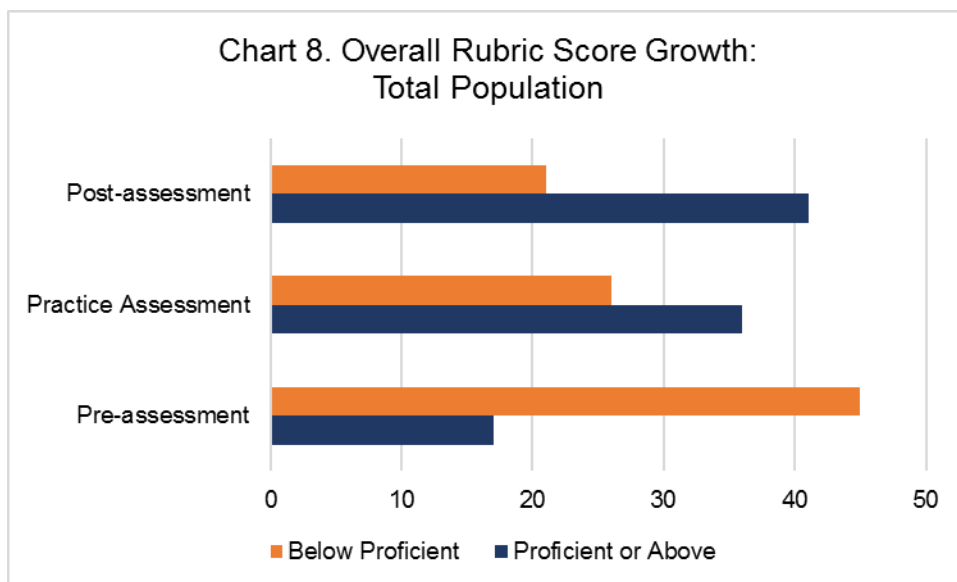
Chart 8. Overall Rubric Score Growth: Total Population.

The clustered bar graph shown in Chart 8 illustrates the amount of growth that took place from the pre-assessment to the post-assessment. The number of participants scoring "proficient or above" increased with each essay while the amount scoring "below proficient" decreased. 45 participants scored "below proficient" on the pre-assessment. On the post-assessment, 21 participants remained in this category. This means that a total of 24 participants moved from "below proficient" to "proficient and above" from the pre-assessment to the post-assessment essay, which represents 39% of the total participant population.

The participants also experienced growth in the "Organization" rubric area, specifically. Chart 9 shows how many participants received a rubric score of 1, 2, 3, or 4 in this writing skill, using data from the pre-assessment, practice assessment, and the post-assessment.

Chart 9. Organization Rubric Score Count: Total Population
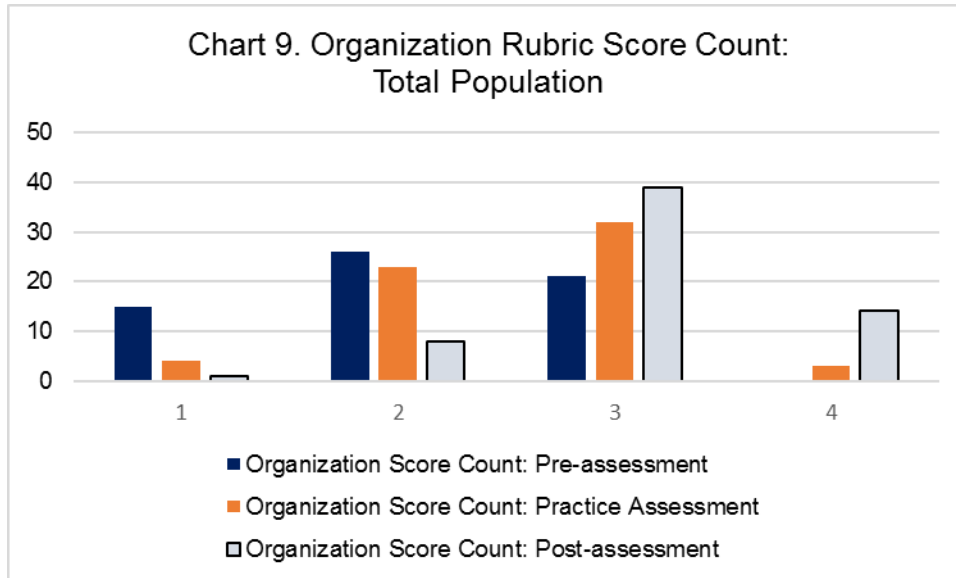
- Organization Score Count: Pre-assessment
- Organization Score Count: Practice Assessment
- Organization Score Count: Post-assessment

Chart 9. Organization Rubric Score Count: Total Population.

The data in Chart 9 displays the number of participants along the Y axis, and organization scores are organized in clusters along the X axis. The dark blue bars show data from the pre-assessment, the orange shows the practice assessment, and the light blue shows the post-assessment. Examination of the organization rubric scores reveals that 15 participants scored a "1" in the pre-assessment for organization, but by the post-assessment that number decreased to one participant. While 26 participants initially scored a "2" in organization, that number went down to eight participants by the post-assessment. Participants who had scored "below proficient" in organization, earning a "1" or a "2" on the rubric, began to improve. The amount of "3" scores increased from 21 to 39, and the number of "4" scores went up from zero to 14 from the pre-assessment to the post-assessment. For many participants, organization was an area of improvement and growth throughout the study.

The next series of charts illustrates overall growth comparisons from the pre-assessment to the post-assessment between selected groups within the total population. The score data was first organized in percentages representing the amount of growth per participant. The mean

average growth was then calculated for each individual sub groups (males, females), and these

average growth percentages are compared in the following chart. Chart 10 displays a comparison

of average total growth between boys' and girls' percentage scores on the pre-assessment and

post-assessment essays.
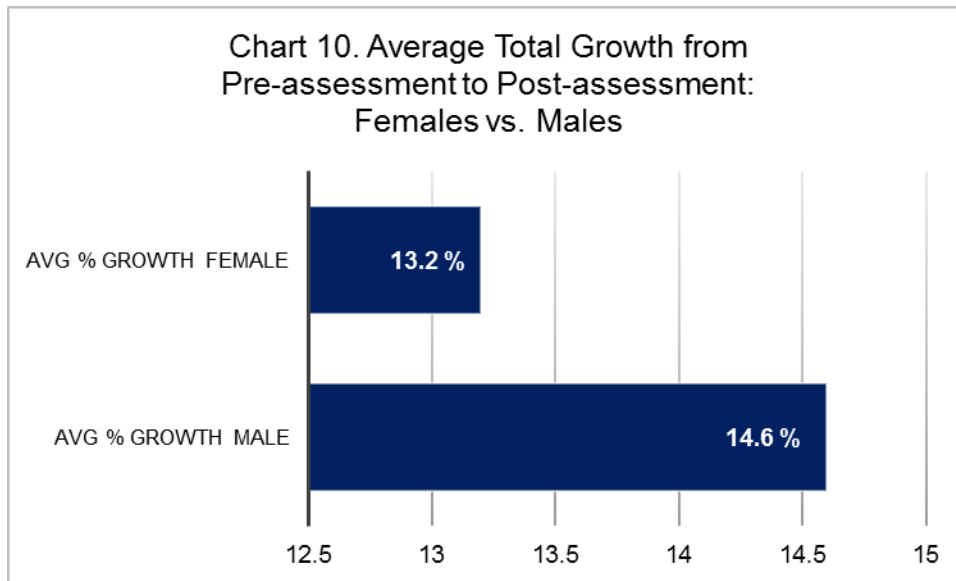
Chart 10. Average Total Growth from Pre-assessment to Post-assessment: Females vs. Males.

       Chart 10 reveals that male participants, on average, experienced 1.4% more growth than

females in their overall percentage scores from the pre-assessment to the post-assessment. The Y

axis displays the growth data separated between males and females, and the X axis shows the

amount of growth, displayed in percentages. The average growth for females was a 13.2%

increase in overall percentage scores, while the average growth for males was a 14.6 % increase.

This means that on average, females increased their essay scores by 13.2% and males by 14.6%

from the pre-assessment to the post-assessment. Boys grew slightly more overall.

       The next chart, Chart 11, shows another comparison between females and males scores

on the four-point rubric. This time, the average growth data for rubric scores in the

"Organization" area of the rubric are shown. Once again, males experienced slightly more

growth than females.
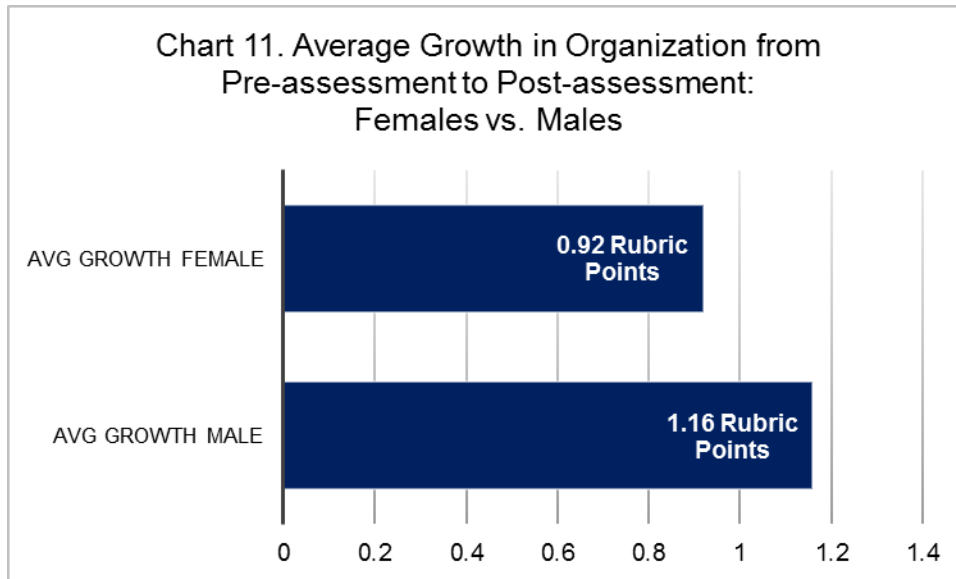
Chart 11. Average Growth in Organization from Pre-assessment to Post-assessment: Females vs. Males.

Chart 11 shows that on average, males grew 0.24 rubric points more than females. The Y

axis in this chart separates the male and female average rubric point growth, and the X axis

displays rubric points. While the difference between female and male growth is small, it is

interesting to note that in both comparisons, males on average experienced more growth in

overall argumentative writing skills and organization than females.

The next series of charts illustrates growth data from the pre-assessment to the post-

assessment for English Learners (EL) and Special Education (SPED) participants compared to

the growth data for the total participant population. Chart 12 compares the average overall

growth in percentage scores for these three groups.
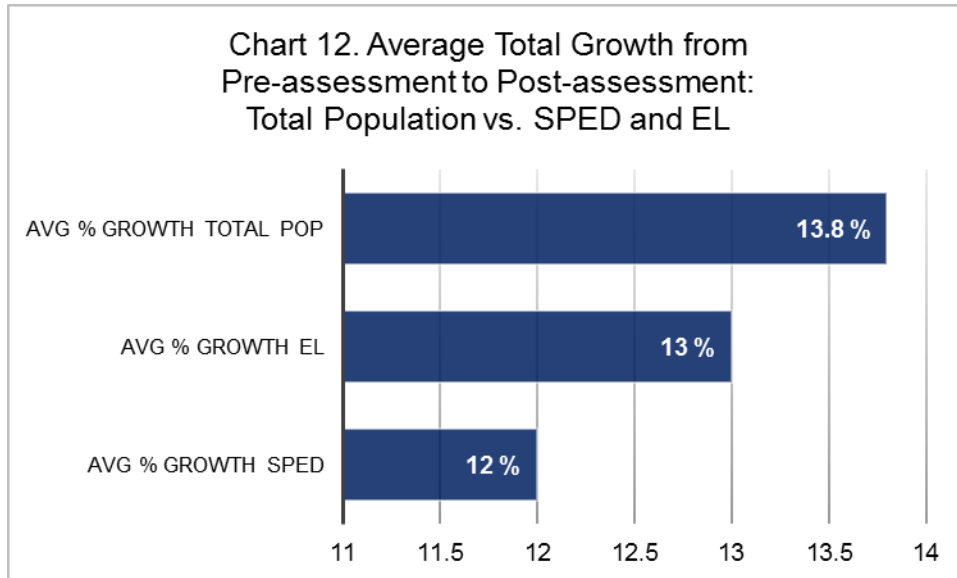
Chart 12. Average Total Growth from Pre-assessment to Post-assessment: Total Population vs. SPED and EL.

Chart 12 indicates that while the average growth in overall percentage scores for the total participant population was 13.8%, EL and SPED participants experienced less average growth in their percentage scores than the average growth of the total participant population. The data is separated by the total participant population, EL population, and SPED population along the Y axis. The X axis shows the percent growth for these groups. Compared to the total participant population's average growth, EL participants grew 13% on average, and SPED participants saw an average growth of 12%. Though the differences in average growth percentages are slight, it is interesting to note that EL participants grew a full percentage point more than SPED participants on average.

Chart 13 continues the average growth comparison of these groups, but this time in the rubric area of "Organization."
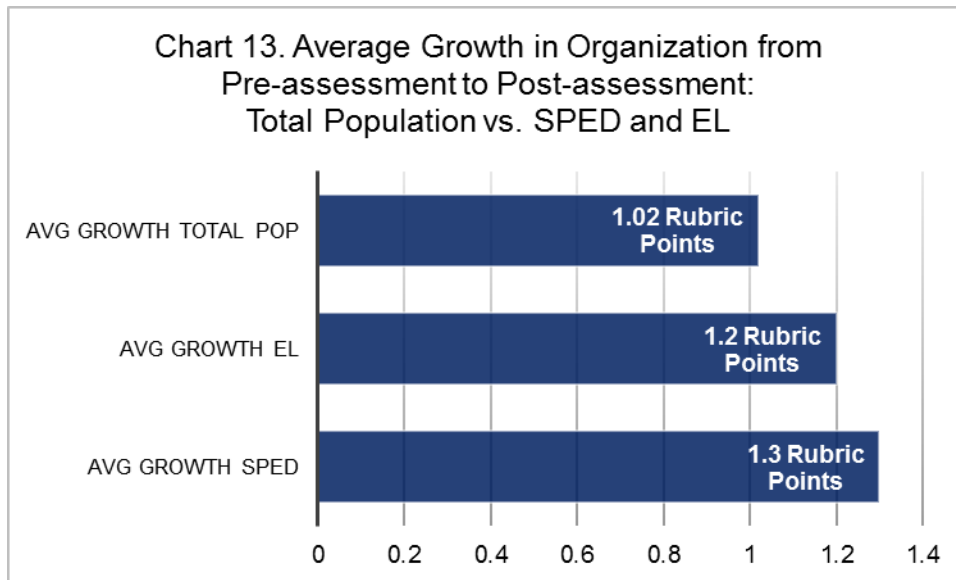
Chart 13. Average Growth in Organization from Pre-assessment to Post-assessment: Total Population vs. SPED and EL.

From the pre-assessment to the post-assessment, EL and SPED participants grew more in organization on average than the total participant population. Chart 13 shows the average growth for these populations that are separated into groups along the Y axis, while the X axis displays the number of rubric points each population grew on average. The average growth of the total participant population was 1.02 rubric points, the average growth for EL participants was 1.2 rubric points, and the average growth for SPED participants was 1.3 rubric points. Again, the numbers show only a slight difference in average growth between the groups, but it is interesting to see that this time, the special populations experienced more average growth than the total population, and that SPED participants grew a little more than EL participants in organization.

The results of the quantitative data presented in this section are analyzed with the findings of the qualitative data in the discussion section.

Discussion

After examining the quantitative results, this researcher concluded that the amount of growth seen in the total participant population, measured as average overall growth and average

growth in organization, is statistically significant. All of the average growth data collected in this study exceeds 5%, which is required for claiming statistical significance. The total participant population experienced an average overall growth of 13.8% from the pre-assessment essay to the post-assessment essay. The total participant population also grew, on average, one (1.02) rubric point on the four-point rubric in the area of organization. This illustrates approximately 25% average growth in organization.

The growth seen in selected groups is also statistically significant. Male participants grew an average of 14.6% while female participants grew an average of 13.2% in their total overall scores from the pre-assessment to the post-assessment. In organization, females experienced an average improvement of .92 rubric points from the pre-assessment to the post-assessment, which is approximately 23% growth on the four-point rubric. Males improved by 1.16 rubric points on average, which reflects 29% average growth in organization. Participants who were English Learners (EL) grew an average of 13% in their overall scores, and grew an average of 1.2 rubric points, or 30%, in organization. Participants who were identified Special Education students (SPED) experienced 12% average growth in their overall scores, and also grew an average of 1.3 rubric points, or 33%, in the organization area of the four-point rubric from the pre-assessment to the post-assessment.

Based on the quantitative results alone, it cannot be concluded that the manipulatives contributed to the growth data. Other language-based writing strategies, such as peer review and a graphic organizer, were used alongside the manipulatives as additional supports. These additional variables limit the validity of concluding that the manipulatives were the sole or main contributor to the average growth of the total population and selected groups. When the findings of the quantitative data is examined with the quantitative results, however, it is clear that the

participants generally viewed them as a strategy that had value to their writing process. Based on the feedback given in interviews and the observation notes of this researcher as participants used the manipulatives, it is reasonable to believe that they generally assisted participants in organization skills.

In the practice assessment and post-assessment interviews, the participants were interviewed about their experience with the manipulatives. More participants thought that the manipulatives were helpful than unhelpful for the practice assessment, but the post-assessment interviews reflected that more participants found them unhelpful than helpful. To account for this change in perspective, several possible conclusions can be drawn.

Upon closer examination of the feedback the participants gave in this area, the participants often made comments about the amount of writing required for each strategy—too much "extra" writing to complete in addition to the essay itself was often perceived as an unhelpful strategy. The common theme was that strategies that took the least amount of written effort were seen as the most helpful. The manipulatives could have been a helpful strategy, then, since there was no additional writing the students had to do. The sentence starters helped reduce actual writing time of the essay since parts of sentences were pre-formed. Teacher review, which entailed a feedback conversation between the teacher and students and a brief written reflection, required little additional writing. The same was true for peer review, which contained only a short feedback form to guide peer to peer conversation feedback and allow for brief reflection. The graphic organizer and notes, on the other hand, required additional written effort that, though the intent was to make the writing process more streamlined by gathering information in one place, actually slowed the students down with more written tasks. The participants who

found these strategies "least helpful" across both interviews commented that these strategies seemed like something "extra" that they were reluctant to complete.

The manipulatives were meant to be a scaffold to assist the participants at the revision stage. The purpose was to help the participants see their drafts in a new way, where they could identify things they needed to revise in their final draft in order to improve it: a lack of evidence or examples, poorly organized ideas, or areas where more explanation was needed could have been things they discovered while building models of their first drafts. Many participants saw the benefit of this activity the first time they used the manipulatives, evidenced by feedback that said the manipulatives "helped to see the essay in a new way" or "helped to see what was missing". However, like any scaffolds, the support becomes unnecessary once the student grows more proficient at the skill. This researcher believes that due to the feedback in the post-assessment interviews where participants claimed the manipulatives were a "waste of time" or "not needed," this could be reflecting the fact that the support became obsolete once the participants knew what they were looking for to change in their drafts.

The participants did see the value in the manipulatives as a writing strategy, and this is evidenced by their feedback across both the practice-assessment and the post-assessment interviews. More participants named the manipulatives as the most helpful strategy overall. While this perspective may have been influenced by the fact that the manipulatives as a writing strategy did not require any extra writing, the feedback from the interviews for participants who said the manipulatives were helpful reflect an awareness of specific ways the manipulatives helped them to improve their essays.

Groups that were selected for analysis within the total population included males, females, EL participants, and SPED participants. While all of these groups showed growth, the

groups who had the most average growth were male participants in both total score and

organization score, EL participants for total score, and SPED participants for the organization

score. To account for this growth, the interview data reveals that more male participants than

females thought that the manipulatives were a helpful writing tool. Most EL participants

expressed that while they had initial confusion, they appreciated the ability to build the model

and see their writing in a new, different way. In both interviews, most SPED participants

described specific benefits in regard to the manipulatives, also commenting that they were fun to

use. The feedback that these groups of participants gave indicates that the manipulatives helped

them improve their argumentative writing skills overall as well as in organization.

Therefore, from analyzing the qualitative findings along with the quantitative results, it is

evident that manipulatives can provide benefits to student academic writing, and that

organization is a writing skill that can be improved using manipulatives. Writing skills from

groups including SPED and EL also improved by using the manipulatives.

Summary of Chapter

The mixed-methods data collected and analyzed in this study included qualitative

findings and quantitative results. The findings from the interviews and observations revealed that

participants viewed the manipulatives as a helpful writing strategy overall. It was a strategy that

required little extra writing effort, which is positive as writing is often a non-preferred activity

for middle schoolers, and often teachers need to find creative ways to keep their adolescent

students engaged in the act of writing or thinking about their writing. In addition, the results from

the pre-assessment and post-assessment showed that the population experienced growth overall

as well as growth in organizing their writing. Selected groups also showed growth in these areas.

By comparing the interview comments to the growth, the study indicated that manipulatives can

be a helpful writing strategy to implement in the middle school writing classroom. Implications

of this study and recommendations for further research are discussed further in chapter five.

Chapter Five: Thesis Recommendations

This study examined the research question "how can manipulatives benefit middle school students in revising argumentative writing?" It also explored the sub-question "how can manipulatives help middle school students with unique learning needs in revising argumentative writing? The research presented in this study helps fill a gap in the existing literature on manipulatives in writing classrooms. There are few studies that focus on middle school students, and the topic of manipulatives as a writing strategy has seldom been explored (Goldsby, 2009). Many writing strategies and supports currently used in classrooms include notetaking, graphic organizers, sentence frames, and review by a peer or teacher. These types of activities are primarily language-based, and students who struggle with language skills should have more hands-on learning opportunities during the writing process. Students with kinesthetic learning preferences, especially, can become disengaged when asked to write. This study inquired into ways that manipulatives might fill a need for hands-on writing strategies that can engage the academically diverse students in middle school classrooms today.

A mixed-methods research design was implemented for this study, as both qualitative and quantitative data were collected and analyzed. Quantitative data consisted of scores from written argumentative essays. The seventh-grade participants wrote a total of three argumentative essays-- one in early September, one in late October, and one in early December of the fall 2016 semester of the school year. These essays were scored using a rubric that measured argumentative writing skills, and the results were analyzed for growth. After participants had completed a first draft during the process of writing the practice assessment and the post-assessment, they had an opportunity to use the manipulatives as well as other writing strategies. Qualitative data consisted of interviews between the researcher and each participant. Interviews

were conducted twice throughout the study, during the practice assessment and the post-assessment essays. Participants were questioned about their experiences with the manipulatives and other language-based writing strategies used throughout the writing process, and whether they viewed them as a helpful or unhelpful writing tool.

Findings Summary

Previous literature in the topic of manipulatives as a writing strategy includes testimony from instructors and observation discussions, but no data has been collected before to investigate whether manipulatives can benefit students in writing. This study contributes quantitative and quantitative data from 62 seventh grade participants to the existing research. The results of the essay scores and the findings from the interviews showed that yes, manipulatives can be a beneficial tool for middle school writers, helping them to revise academic writing, particularly in the area of organization and particularly for English Learners and boys. The essay scores reflected growth from the pre-assessment to the post-assessment in both overall scores and in organization. Selected populations representing students with unique learning needs also showed growth in these areas. Data from the interviews reveals that initially, participants thought the manipulatives were helpful. However, for various reasons, their perception of the manipulatives as a helpful writing tool diminished in the post-assessment interviews. This could be due to the fact that the participants needed more time with the manipulatives, they needed more clarification regarding their intended use, or that they no longer needed the tool once the skill was learned.

Unexpected findings include the fact that more participants thought that the manipulatives were helpful during the practice assessment than during the post-assessment. Additionally, EL participants showed more average growth overall than SPED participants, but

SPED participants exceeded the average growth of EL participants in organization. These two groups also grew less than the total participant population overall, but grew more than the total population in organization. These results were unusual and may have been caused by limitations within the research design.

The findings and results in this study suggest that manipulatives can benefit students with unique learning needs in writing. Participants with learning disabilities, identified as Special Education (SPED), showed the most growth in organization after using the manipulatives. Their comments in both interviews cited specific ways that the manipulatives helped them gain insight as to how they should revise their drafts, in areas relating to organization in particular. This adds data to corroborate Hecker's (1997) article that claims construction toys like Tinkertoys and Legos can help students with learning disabilities in writing. Although Hecker's idea of using these toys to help students revise their writing was done only with college-aged students, this research shows that they do have value as a writing tool for younger people with learning disabilities as well.

Findings Interpretations

The dependent variables in this study were the argumentative writing skills of seventh grade students and the language-based writing skills used to support the students in writing argumentative essays. The independent variable was the manipulatives, which were used in the practice and post-assessment essays that the participants completed over the course of this study.

The essay scores from the pre-assessment, practice assessment, and post-assessment show a steady average growth for the total participant population. The same is true for selected groups, such as EL and SPED participants. Boys showed more growth than girls in both overall essay scores and in organization, which could be due to the fact that many female participants

scored higher on the pre-assessment than the males and thus did not grow as much in their scores. It could also mean that because the tool was not available in the pre-test, boys were not able to score as high. Boys also tend to be less skilled in language-based activities than girls. The opportunity to think through their writing in a non-language manner could impact boy's writing in positive ways.

The amount of growth in writing that the participants achieved could be either typical or atypical, as this sort of growth data had not been collected from prior classes in years past. There also was no control group against which this data could be compared. The different writing strategies may have contributed in varying degrees to the participants' growth, since the manipulatives were not studied in isolation.

After looking at the feedback the participants gave regarding the use of manipulatives, it is apparent that some preferred strategies required less writing than the non-preferred strategies. Manipulatives in this study were used in a way that required no writing, just verbal explanation and thought. When thinking about the sub-groups that were analyzed in this research, it is apparent that extra writing is often perceived as a hindrance than as a help.

However, the fact that fewer participants found the manipulatives helpful at the post-assessment interviews suggests that, like any scaffold, the tools for learning can become obsolete. Something that was seen as novel, interesting, and helpful at first can seem like a waste of time once the skill is learned.

Findings in Context

This study is valuable to the educational field as it provides guidance for teachers looking to make learning hands-on for middle school students by incorporating kinesthetic strategies into the writing process. It adds empirical data to an area of education in which the majority of

research has been in the math and science classrooms. In research that does contain reference to

manipulatives as a writing tool, the evidence is presented as a testimonial account, without

additional data. This study, through quantitative and qualitative data, shows that writing

instruction can include kinesthetic inspiration, and that manipulatives can be a helpful learning

tool for revising writing if the purpose is clearly communicated.

<div align="center">**Implications for the Classroom**</div>

This study revealed several implications for middle school writing classrooms. This

researcher recommends that if teachers are looking to use manipulatives as a writing strategy,

they must be used purposefully. Students should be able to acclimate themselves to the

manipulatives in a way that makes sense to them, which may take more time than this study

permitted. This research examined the use of manipulatives as a tool before revising writing, but

they could also be used as a planning or brainstorming strategy before starting a first draft. In any

case, this research suggests that manipulatives are used most successfully when students

understand their purpose as a writing strategy, have adequate time to experiment and play with

them, and are allowed to choose when to use them in the writing process. There does need to be

some structure when students use manipulatives, as middle school students are prone to

distraction. Without guidance and the support of structure, they may see the manipulatives as

more of a toy than a tool.

Use of the manipulatives

After examining the data collected in this study, this researcher learned that middle

school students need to know the purpose for everything they do in the classroom, including the

use of writing strategies. The participants' first experience with the manipulative cubes revealed

that they needed to have the purpose of this learning tool not only communicated to them, but

also modeled. During use, the teacher should question students regarding their ideas and how

they are using the manipulatives. Comments by the students were that they didn't understand

what to do, and that they were confused by what the cubes were actually for. This researcher,

being their teacher, avoided communicating the purpose at first in order to give more of an

exploratory approach to the use of manipulatives in writing. After seeing initial confusion, as

described in the observation notes, this researcher gave more explanation about why the

manipulatives were being used. By explaining that it was a revision tool during their first

encounter with the manipulatives at the practice assessment, and that the cubes should be used to

represent ideas and elements in their essays, the meaning behind the manipulatives became

clearer to the participants.

Hecker's (1997) study took an exploratory approach to manipulatives in writing with

college-aged students, but due to the literal nature of adolescent reasoning (citation), however,

the students needed a more concrete correlation between the manipulatives and what they should

represent. Once the researcher gave this correlation, the students saw a clearer purpose for the

potential helpfulness of the manipulatives. The interviews for the pre-assessment were mostly

positive reviews of their experiences, stating specific benefits that they saw as they went to

revise their essays. Some participants expressed that they were able to see what they were

missing in their writing. For example, the participants made comments like, "I saw things that I

could add after building the model" and "I realized I needed more examples in my paragraph."

By correlating the color of the linking cubes to an element of their paragraph such as evidence or

explanation, they could see what they needed to add in their final drafts. Other benefits that the

students expressed were that the manipulatives were a positive addition to the writing process

simply because they were a different medium than writing itself. Some participants described

how the manipulatives gave their brains a break, relieved stress, and changed their perception

from the way they normally thought about writing.

Despite the communication of the purpose and suggestion for potential uses of the

manipulatives during the pre-assessment, the interview feedback revealed that many of the

students were still confused as to how the manipulatives could be a useful tool for writing. Some

students also expressed that the linking cubes felt like something better suited to preschool.

Because these comments were a common theme in the pre-assessment interviews, this researcher

recommends that the purpose of the manipulatives cannot just be clearly stated, but modeled by

the teacher. The students might have needed more experience with the manipulatives.

Integrating strategies like having students articulate their reasoning behind why they built their

models in a certain way with others in the form of a think-pair-share, or having students gather

around in a fishbowl exercise to see how other students are using the manipulatives would have

been helpful structures to integrate in order to mitigate confusion. In addition, the teacher should

explain the value of play for stimulating deeper thinking, and show that sometimes something

that can appear to be fun can also be educational.

This researcher also recommends that after an initial, clearly explained and experienced

session with the manipulatives, they become an optional tool thereafter. Most of the negative

feedback regarding the helpfulness of the manipulatives in the post-assessment interviews

revealed that many participants preferred to not take time to build a model but rather use an

annotation strategy like highlighting or underlining their writing in different colors to achieve the

same purpose. Some simply found other strategies like using a graphic organizer or having a peer

review their writing to be more effective in their writing process, and, if given the choice, would

not select manipulatives as a revision tool.

Limitations

There were several limitations in this study that open opportunities for future research. First, the sample did not contain even demographics among the sub-groups under analysis. This was due to the convenience nature of the sample, but could be adjusted in future studies. Secondly, no interview data was collected to gather feedback on the use of no manipulatives at all. A third limitation is the fact that this researcher, as the teacher for the participants, did not have complete freedom to conduct experimental research with the manipulatives as there was still a responsibility to teach the standards and use best practices to do so. This is why other writing strategies were also used in the writing process for the essays the students completed, with the exception of the pre-assessment, which was a "cold" writing sample. In addition, there was no control group included in this research. Future research should include a control group that does not use manipulatives, so that data comparisons can be made between a group that did use manipulatives and group that did not. Experimental design would point out whether growth would occur without the use of specific writing strategies such as the manipulatives.

A fourth limitation is the bias of the researcher, who scored all of the essays included in the pre-assessment, practice assessment, and post-assessment score data. As the teacher of the participants, there is a level of bias that could be reduced by having others score the essays through a process of calibration and re-scoring if necessary. On the other hand, as teacher I know the students better than an outside scorer and have their trust in terms of trying the manipulatives.

Finally, a fifth limitation is that for the purposes of this research, only students who had completed a rough draft were able to use the manipulatives, and there were some participants who did not accomplish this. Their data was excluded from this study, so this research does not

include students who struggle with meeting deadlines or who had absences that may have

affected their completion of a draft.

Future Research

Future studies in this topic may explore the ways manipulatives can be applied in other

stages of the writing process, such as prewriting. Instead of generally analyzing the participants'

growth in organization of writing, future research may examine more specific areas: clarity of

claims, connecting claims to evidence, and elaboration of evidence. In addition, future research

may analyze sub-groups besides the ones examined in this study. Struggling writers, students

with attention deficit disorders, and students who are considered gifted learners are all interesting

populations that can serve as the focus of future studies.

Experimental design should be applied to future research, as this would offer a clearer

picture regarding whether or not manipulatives are actually an effective learning tool. Because

this study used additional language-based writing strategies besides the manipulatives, it is

difficult to say whether or not the manipulatives made a difference in the participants' growth in

writing. The interviews offered some insight into the participants' experiences with the

manipulatives, but data showing that students who used manipulatives showed more growth than

those who did not use manipulatives would offer a more conclusive perspective on this topic.

This study, while it sought to bring kinesthetic learning strategies into the writing

classroom, did not include surveys regarding multiple intelligences and learning preferences of

the participants. Future studies may want to include this sort of data in order to analyze how

participants of each intelligence responded to the use of manipulatives.

Conclusion

This study inquired into how manipulatives can be used as a revision tool to benefit middle school students in academic writing, and also examined sub-groups, including boys, girls, English Learners, and Special Education students in order to see if some groups benefited more than others. The methodology for this study was a mixed-methods research design that gathered qualitative data in the form of interviews and quantitative data in the form of essay scores. 62 seventh grade students participated in this research, and were a convenience sample from this researcher's own classes. This researcher was the teacher for all 62 participants during the time of this research. Over the fall 2016 school semester, the participants wrote a total of three argumentative essays. The pre-assessment was completed without the use of manipulatives. The practice assessment essay and the post-assessment essay were completed with the use of manipulatives as a writing strategy at the revision stage of the writing process. After using the manipulatives for those two essays, the participants were interviewed about their experiences with different writing strategies and whether they perceived those strategies as helpful or unhelpful as they worked on their essays. The scores collected from the three essays represent the quantitative data, and the interviews represent the qualitative data. The quantitative data was analyzed for growth trends of the total participant population and that of the sub-groups under study, and the qualitative data was analyzed for themes among the participants' responses to the interview questions. Both types of data were examined together to reveal possible reasons for the outcome of the essay scores

The results of this research show that the total population showed growth over the course of the three essays, and that the sub-groups also showed growth. The findings from the interviews revealed that while manipulatives were perceived to be the most helpful writing strategy overall, the participants also thought they were more helpful the first time they were

used than the second time. This could be because the manipulatives required the least amount of

extra writing than the other strategies used, like graphic organizers and notes, and that the

manipulatives lost their usefulness after the participants had mastered the skills that the

manipulatives were meant to support. This researcher recommends that the purpose of the

manipulatives is always clear in order to avoid confusion and to create meaningful participation

in the activity, and that the manipulatives become an optional tool after the first use so that

students who do not need the support do not have to sacrifice their class time for something they

may view as useless.

This research begins to fill a gap in the research regarding hands-on strategies in the

writing classroom. Kinesthetic learning strategies are often underutilized in this setting, and this

study suggests that manipulatives can be a beneficial tool for helping middle school students

revise their writing. This study adds quantitative and qualitative data to the existing literature that

already indicated that manipulatives could be helpful for students as they write (Hecker, 1997),

but further empirical data and experimental studies are needed in order to provide further

recommendations for the use of manipulatives as a writing tool. By incorporating more

kinesthetic learning strategies into settings where traditional, language-based learning is the

norm, a wider population of students can access the learning necessary to improve their skills in

academic writing.

References

Armstrong, T. (2009). Multiple Intelligences in the Classroom (3). Alexandria, US: ASCD.

Retrieved from http://www.ebrary.com

Blakemore, S. (2008). The social brain in adolescence. *Nature Reviews Neuroscience, 9,*

267-277.

Cain-Caston, M. (1996). Manipulative queen [Electronic version]. *Journal of Instructional*

Psychology 23(4), 270-274. Retrieved January 10, 2017 from Ebscohost database.

Chamberlin, L., & Chambers, N. (1991). A Brain Primer for Educators: Implications for

Learning. *The Clearing House: A Journal of Educational Strategies, Issues and*

Ideas, 64(4), 228-231.

De La Paz, S., Swanson, P. N., & Graham, S. (1998). The contribution of executive control to

the revising by students with writing and learning difficulties. *The Journal of Educational*

Psychology, 89, 223-234.

Dunn, P. A. (2001). Talking, sketching, moving: Multiple literacies in the teaching of writing.

Portsmouth, New Hampshire: Boynton/Cook Publishers, Inc.

Dweck, C., Goodstein, Leonard D., Glaser, Robert, & Takanishi, Ruby. (1986). Motivational

Processes Affecting Learning. *American Psychologist, 41*(10), 1040-1048.

Englert, C., & Raphael, T. (1988). Constructing well-formed prose: Process, structure, and

metacognitive knowledge. *Exceptional Children, 54,* 513-520.

Gardner, H. (1983). *Frames of mind: The theory of multiple intelligences.* New York: Basic

Books, Inc.

Gardner, H. 1999 Intelligence Reframed: Multiple intelligences for the 21st Century, New York,

Basic Books.

Garrity, C. (1998). *Does the use of hands-on learning, with manipulatives, improve the test*

    scores of secondary education geometry students? Master's, St. Xavier University.

Graham, S., Harris, K. R., MacArthur, C. A., & Schwartz, S. S. (1991). Writing and writing

    instruction with students with learning disabilities: A review of a program of research.

    Learning Disability Quarterly, 14, 89-114.

Hecker, L. (1997). Walking, Tinkertoys, and Legos: Using Movement and Manipulatives to Help

    Students Write. The English Journal, 86(6), 46-52.

Hecker, L., Klein, K. (1994). "The Write Moves: Cultivating Kinesthetic and Spatial

    Intelligences in the Writing Process." *Presence of Mind: Writing and the Domain Beyond*

    the Cognitive. Eds. Brand, A. G., Graves, R.L. Portsmouth: Boynton/Cook. 89-98.

Hinzman, K. P. (1997). *Use of manipulatives in mathematics at the middle school level and their*

    effects on students' grades and attitudes. Retrieved from ERIC.

Kennedy, L. M. (1986). A Rationale. *The Arithmetic Teacher, 33*(6), 6-7, 32.

Klem & Connell. Relationships Matter: Linking Teacher Support to Student Engagement and

    Achievement.

Lindroth, L. (2005). How to... find online math manipulatives. *Teach PreK–8, 35*(4),

    24–26.

Ladd, T. (2001). "Process Pedagogy." *A Guide to Composition Pedagogies*. Ed. Tate, G.,

    Rupiper, A., & Schick, K. 1-18. New York: Oxford UP.

Maimon, Elaine P. (1988). Cultivating the prose garden. (helping students realize their writing

    potential) (includes related articles on stages of writing process, and ideas for journal

    writing). *Phi Delta Kappan, 69*(10), 734.

Marks, HM. Student engagement in instructional activity: patterns in the elementary, middle, and high school years.

McCutchen, D. (1998). "Functional automaticity" in children's writing: A problem of metacognitive control. *Written Communication, 5,* 306-324.

Munger, D. (2007, October 9). Children learn and retain math better using manipulatives [Msg.1]. Message posted to http://scienceblogs.com/cognitivedaily/2007/10/children_learn_and_retain_math.php

National Middle School Association. (2010). *This we believe: Keys to educating young adolescents.* Westerville, Ohio: Association for Middle Level Education.

Rhodes, K. L. (2015). *Self-perception as a predictor of academic performance in adolescents with learning disabilities* (Order No. 3732877). Available From ProQuest Dissertations & Theses Global: The Humanities and Social Sciences Collection. (1746687053).

Salyers, F., & McKee, C. (n. d.). The young adolescent learner. *Annenberg Learner.* Retrieved from http://www.learner.org

Seefeldt, C., & Wasik, B.A. (2006). *Early education: three-, four-, and five-year-olds go to School* (2nd ed.). Upper Saddle River: Pearson Education.

Sherman, J., & Bisanz, J. (2009). Equivalence in symbolic and nonsymbolic contexts: Benefits of solving problems with manipulatives. *Journal of Educational Psychology, 101*(1), 88–100.

Shor, I. (1980). *Critical teaching and everyday life.* Boston: South End Press.

Smith, S.S. (2009). *Early Childhood Mathematics* (4th ed.) Boston: Pearson Education Using manipulatives (2009). Retrieved December 10, 2009, from : http://www.teachervision.fen.com/pro-dev/teaching-methods/48934.html

Sowell, E. (1989). Effects of manipulative materials in mathematics instruction. Journal for

    Research in Mathematics Education, 20, 498-505.

Stahl, S. A. (1999). Different strokes for different folks? A critique of learning styles. American

    Educator, 23, 27–31.

Stephenson, D., & Hochstleter, S. (2002). A diversity of writers: Fun with kinesthetic. *Language*

    Arts Journal of Michigan, 18(1), 53-59.

Suydam, M. & Higgins, J. (1977). *Activity-based learning in elementary school mathematics:*

    Recommendations from research. Columbus, Ohio: ERIC Clearinghouse for Science,

    Mathematics, and Environmental Education.

Thomas, C. C., Englert, C. S., & Gregg, S. (1987). An analysis of errors and strategies in the

    expository writing of learning disabled students. *Remedial and Special Education, 8*(1),

    21-30.

Wiley, M. The Popularity of Formulaic Writing (and Why We Need to Resist). The English

    Journal. September, 2000.

Wilkins, S. 1995. "A Teacher's Guide to the Brain. "The Learning Disabilities Network

    Exchange. 13: 1-8.

Appendix A: Argumentative Writing Rubric

	Statement of Purpose	Organization	Development: Elaboration of Evidence	Language and Vocabulary	Conventions
4 Exemplary—Exceeds Standard	The response is fully sustained and consistently and purposefully focused. • Claim is clearly stated, focused, and strongly maintained. • Where appropriate, alternate or opposing claims are clearly addressed. • Claim is introduced and communicated clearly within the context.	The response has a clear and effective organizational structure creating unity and completeness. • Effective, consistent use of a variety of transitional strategies. • Logical progression of ideas from beginning to end. • Strong connections among ideas, with some syntactic variety. • Effective introduction and conclusion for audience and purpose.	The response provides thorough and convincing support/evidence for the writer's claim that includes the use of sources, facts, and details. The response achieves substantial depth that is specific and relevant. • Use of evidence from sources is smoothly integrated, comprehensive, relevant, and concrete. • Effective use of a variety of elaborative techniques.	The response clearly and effectively expresses ideas, using precise language. • Effectively establishes and maintains a formal style. Use of domain-specific vocabulary is clearly appropriate for the audience and purpose.	The response demonstrates a strong command of conventions. • Few, if any, errors are present in usage and sentence formation. • Effective and consistent use of punctuation, capitalization, and spelling.
3 Proficient—Meets Standard	The response is adequately sustained and generally focused. • Claim is clear and for the most part maintained, though some loosely related material may be present. • Context provided for the claim is adequate. • Where appropriate, adequately acknowledges alternate or opposing claims.	The response has an evident organizational structure and a sense of completeness, though there may be minor flaws and some ideas may be loosely connected. • Adequate use of transitional strategies with some variety. • Adequate progression of ideas from beginning to end. • Adequate introduction and conclusion. • Adequate, if slightly inconsistent connections among ideas.	The response provides adequate support/evidence for the writer's claim that includes the use of sources, facts, and details. The response includes some depth and specificity but is predominately general. • Some evidence from sources is integrated, though citations may be general or imprecise. • Adequate use of some elaborative techniques.	The response adequately expresses ideas, employing a mix of precise with more general language. • Adequately establishes and maintains a formal style. • Uses domain-specific vocabulary that is generally appropriate for the audience and purpose.	The response demonstrates and adequate command of conventions. • Some errors in usage and sentence formation may be present, but no systematic pattern of errors is displayed. • Adequate use of punctuation, capitalization, and spelling.
2 Partial—Approaches Standard	The response is somewhat sustained and may have a minor drift in focus. • May be clearly focused on the claim but is insufficiently sustained. • Claim on the issue may be somewhat clear and unfocused. • Where appropriate, somewhat acknowledges alternate or opposing claims.	The response has an inconsistent organizational structure and flaws are evident. • Inconsistent use of basic transitional strategies with little variety. • Uneven progression of ideas from beginning to end. • Conclusion and intro, if present, are weak. • Weak connection among ideas.	The response provides uneven, cursory support/evidence for the writer's claim that includes partial or uneven use of sources, facts, and details and achieves little depth. • Evidence from sources is weakly integrated, and citations, if present, are uneven. • Weak or uneven elaborative techniques.	The response expresses ideas unevenly, using simplistic language. • Partially establishes a formal style. • Uses domain-specific vocabulary that may at times be inappropriate for the audience and purpose.	The response demonstrates a partial command of conventions. • Frequent errors in usage may obscure meaning. • Inconsistent use of punctuation, capitalization, and spelling.
1 Minimal—Begins Standard	The response may be related to the purpose by may offer little relevant detail. • May be very brief • May have a major drift • Claims may be confusing or ambiguous.	The response has little or no discernible organizational structure. • Few or no transitional strategies are evident. • Frequent extraneous ideas may intrude.	The response provides minimal support/evidence for the writer's claim that includes little or no use of sources, facts, and details. • Use of evidence from sources is minimal, absent, in error, or irrelevant.	The response expresses vague ideas, lacks clarity, or is confusing. • May have little sense of audience or purpose. • Uses limited domain-specific vocabulary.	The response demonstrates a lack of command of conventions. • Errors are frequent and severe and meaning is often obscure.

Appendix B: Graphic Organizer

Claim

Evidence

Source

Explanation

Significance