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An Exploratory Study of the Effects of a Technology-Based Graphic Organizer and 1:1 Chromebooks on the Persuasive Writing of Third-Grade Students

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AN EXPLORATORY STUDY OF THE EFFECTS OF A TECHNOLOGY-BASED
GRAPHIC ORGANIZER AND 1:1 CHROMEBOOKS ON THE PERSUASIVE
WRITING OF THIRD-GRADE STUDENTS

by

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DEDICATION

I dedicate this dissertation to my son, Ben. His unconditional love, kindness, and understanding encouraged me to push myself further through this journey and every day. To my fur family members, Wrigley, Roxie, Rookie, and Doug, for keeping me company during the long nights and weekends of work. Finally, to all my friends who have been cheerleaders providing words of encouragement throughout the completion of this program in support of me accomplishing this life goal.

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ABSTRACT

The purpose of this qualitative action research was to determine the effectiveness of a technology-based graphic organizer on student achievement, engagement, and motivation in writing. The study explored the usefulness of incorporating a mind-mapping program, using Chromebooks to assist students when brainstorming ideas for a persuasive essay. Further, this study examined third-grade English language arts students' perceptions of the use of technology to write persuasive essays using a specific writing prompt.

The teacher-researcher collected and recorded data on eight third-grade students over seven days. To identify and validate the study's findings, field notes, student interviews, student reflective digital journals, surveys, and student artifacts were the data collection sources used by the teacher-researcher to measure student engagement and assess students' perceptions.

Four themes emerged from the summative data analysis of qualitative data. The results revealed positive benefits between student achievement, engagement, and motivation and writing instruction when technology was integrated into the English language arts curriculum. The findings from this study offered a source of planning and action to enhance instructional practices in the English language arts curriculum. Further, these findings have the potential to benefit and inform educators of English language arts and instructional technology.

Keywords: achievement, action research, Chromebook engagement, motivation,

technology, writing

TABLE OF CONTENTS

CHAPTER 1

ACTION RESEARCH OVERVIEW

The students entered their school eager to begin an exciting year in the third grade. Their teacher, Ms. Lewis, greeted them at the door with a big, welcoming smile. After the students unpacked their book bags filled with notebooks, folders, pens, and pencils, they readily found their desks displayed with colorful nametags. As they settled in, students noticed black bags located at their desks and immediately began investigating what these bags contained. As the students unzipped the black bags, a buzz of excitement filled the classroom as inside was a new Chromebook assigned to each student.

Soon the tardy bell rang, and Ms. Lewis, having watched the excitement unfold, informed the enthusiastic third graders that the Chromebooks were important tools that would be used to help them learn many things during the school year, such as reading, math, social studies, science, and language arts, including writing. Following Ms. Lewis' emphasis on writing, Jack raised his hand to announce that "writing is so hard." Ms. Lewis, who had been teaching for many years, recognized that some students were reluctant writers and found writing difficult. So, with a smile on her face, Ms. Lewis announced, "Thank you, Jack, for being honest. This year, along with many writing strategies and support, Chromebooks will help everyone become better writers!" Jack and the other third graders cheered, and Ms. Lewis' smile got even bigger.

Regrettably, many students in today's classrooms have the same opinion as Jack, and this teacher-researcher has witnessed firsthand how reluctant writers struggle to get

their ideas on paper. Further, even if students do have ideas, they may not know where to start or cannot plan their ideas in an organized manner. This hurdle often creates added stress on students and educators as writing crosses all curricular contents. Therefore, teachers should use a variety of instructional strategies to support writing development, including incorporating technology to enhance the development of skills across curricular areas.

Learning how to write effectively is a life-long skill students must learn to develop. For educators to teach students to write well, they must provide opportunities for them to write often. Educators should teach students how to write effectively by providing them authentic writing opportunities that are meaningful and relevant. Additionally, when educators teach writing, they must be sure to select resources and support materials that not only aid them in instructing students *how* to write but will also be most effective in helping their students learn *to* write. In today's 21st-century classrooms with increased pressure for schools to incorporate new technology, educators must find innovative approaches to teaching, learning, and student engagement while improving skills that students are falling short, which includes writing.

Authentic writing tasks that are relevant and meaningful to students help motivate quality writing (Pennington, 2010). By using curriculum and instruction to support authentic learning, educators can use technology to encourage students to explore various topics. Technology makes the sharing of ideas easier than ever before and is an excellent way for students to share their views with a broader audience that could expand far beyond the walls of the school (Goertz, 2017). For example, a student doing a research project can create a multimedia report with text, graphics, sound, and video. Educators

2

can hold higher expectations that students' research will be more thorough, and projects can be much more specialized and focused on current data because the use of technology will create authentic writing experiences for students (O'Neill, 2013). Further, in authentic learning environments, technology allows different people, media, and points of view to be brought into the classroom, providing the learner opportunities to investigate multiple ideas, roles, and perspectives (Herrington & Kervin, 2007, p. 225).

Statement of Problem

Researchers have noted that although there are thousands of studies on effective methods for teaching reading and mathematics, there are relatively few rigorous studies on writing instruction (The Hechinger Report, 2014). According to the most recent National Assessment of Educational Progress, three-quarters of both eighth and twelfth graders lack proficiency in writing, and forty percent of those who took the ACT writing exam in the high school class of 2016 lacked the reading and writing skills necessary to complete a college-level English composition class (Goldstein, 2017).

In keeping with the demands of the 21st-century classroom, teachers are expected to integrate new technology in place of traditional lessons and pedagogical techniques. Because most kids today are already confident with the use of technology, connected classrooms can also encourage students to think and solve real-world problems. Students who are struggling with writing could use a vast number of tools that can help them become better writers. Graphic organizers are one strategy used to support students in planning writing.

Students need writing skills to be successful in school and life; however, three out of four students are not meeting grade-level proficiency in writing (NAEP, 2011). The

3

NAEP will release national and state results for the 2017 writing assessment in the summer of 2020. In today's 21st-century classroom, teachers must find engaging ways to teach the current generation of students who have grown up with technology as a constant in their lives. These students may need more than traditional lessons and pedagogical techniques to encourage and inspire them to learn. However, the task of improving writing while integrating technology into the classroom in a meaningful and state-of-the-art way can be challenging. A 2013 study of K-12 teachers concluded that teachers are still not using digital tools and technologies to enhance classroom practice (Pittman & Gaines, 2015, p. 540). To encourage teachers to feel confident in technology integration in their classrooms, the role of technology in the classroom must be re-envisioned. Instead of educators using technology to support their instruction where 21st-century learners act as passive learners, Blair (2012) asserted, "A new mindset of teaching through technology must emerge, which depends on a vital shift in teacher and student roles" (p. 10).

To effectively teach writing with technology, teachers must have conceptual knowledge of the writing process, pedagogical knowledge about the teaching of writing, and knowledge about how technology can facilitate growth and development (Ferdig et al., 2014, p. 3). Writing instruction should engage students in their learning while preparing them to be successful in the 21st-century. Culham (2018) asserted, "We need our writing classrooms to be meaningful, purpose-driven places where teachers guide—not control—the writing students generate" (p. 56). Further, the context, the world, and our kids' educational needs have changed, and we need a fresh approach to education (Prensky, 2012, p. 15).

School systems are increasingly embracing technology initiatives in hopes of motivating this always-connected, digitally advanced group of students who actively engage and interact outside of school via texting, gaming, social media, and the Internet. To teachers, it seems that today's students demand new, innovative learning methods that bridge the digital divide between their in-school and out-of-school lives. For educators, this means blending proven pedagogy and curriculum with technology integration in innovative, meaningful, and engaging ways. As educational theorist John Dewey (1944) stated, "If we teach today's students as we taught yesterday's, we rob them of tomorrow" (p. 167).

Technology is now considered by most educators and parents to be an integral part of providing a high-quality education (Ertmer & Ottenbreit-Leftwich, 2010, p. 256). Technology offers efficient ways to help improve skills, techniques, and creativity in writing. Additionally, technology improves students' classroom engagement, increases their academic achievement, advances their reading fluency, and enriches their writing (McDermott & Gormley, 2015, p. 2). Putting technology in the hands of students has many benefits, including supporting their ability to communicate, create, and collaborate with technology while developing higher-order thinking skills (Ritzhaupt et al., 2012, p. 230).

Educators can explore ways to use technology to create authentic learning experiences, specifically writing for all students. Because most kids today are already confident with the use of technology, connected classrooms can encourage students to think and solve real-world problems. Students who are struggling with writing could use a vast number of tools that can help them become better writers. There are a variety of

5

assistive technology (AT) tools available to help students develop their writing skills. Some of these tools support students in the physical task of writing, while others facilitate proper spelling, punctuation, grammar, word usage and organization. Among the AT tools educators can introduce to help students improve their writing skills are Sentence Builder, Write About This, Story Builder, Visuwords, and Google Documents. By integrating AT tools, teachers can use technology to motivate students to invest in improving their writing skills.

Children are natural storytellers; however, children may have difficulty organizing their ideas into written form. Pifarre and Fisher (2011) asserted, "Writing in immature writers indicates that for young children the production of written text is a more direct process of 'think it, write it'" (p. 452). Teachers should incorporate authentic writing experiences to help them process their ideas and improve student achievement, motivation, and engagement. By incorporating authentic writing experiences, teachers include relevant and meaningful activities in their language arts curriculum. Further, using technology in the classroom provides teachers with opportunities to make learning more relevant to students' own lives (Parker et al., 2015, p. 109). In today's technology-saturated society, many young children have access to a range of digital technologies virtually from birth, and they acquire various knowledge and skills related to early literacy as a result of using those technologies (Beam & Williams, 2015, p. 261).

This research focused on the examination of third-grade students' persuasive essays composed with a technology-based graphic organizer (TBGO) incorporating a mind-mapping program, using Chromebooks. One intention of this study was to test the generalizability of the intervention of a TBGO when students brainstorm for a persuasive

6

essay which created the basis for integrating technology to increase student achievement, motivation, and engagement. This study added to the limited empirical research for using the Chromebook by examining its utility as a tool for planning and writing.

While there have been previous studies about the relationship between technology and writing, this study specifically explored the relationship between a prewriting strategy, a TBGO incorporating a mind-mapping program, using Chromebooks and student achievement, engagement, and motivation. The goal of the study was to assist students when brainstorming ideas for a persuasive essay to examine the effect of the different strategies on student achievement, motivation, and engagement. The teacher-researcher proposed student achievement, motivation, and engagement will increase with the use of a TBGO incorporating a mind-mapping program as an advanced planning tool when using the Chromebook for writing. Furthermore, this research study provided clarity to the use of technology to enhance overall growth in writing. With the prevalence of limited writing growth, this study provided evidence to understand what modifications needed to result.

The CCSS addresses the integration of technology in written work. Third graders are expected to use technology for planning and publishing written work (CCSS, 2017). Not only will students need to use technology to compose, but they will also need to become accustomed to taking assessments online. Online state-mandated assessments given to students in grades three through twelve include writing components such as short-answer, constructed response, and essays where students are required to integrate writing and technology.

Technology can be a powerful tool for transforming learning (OET, 2017). In response to federal initiatives, many school districts across the United States have invested in 21ˢᵗ-century connected classrooms to support students' academic achievement in areas such as writing. One device that has gained popularity, both in the United States and globally, is the Google Chromebook. Chromebooks are inexpensive to buy and support, which makes them are ideal for budget-conscious school districts. In the classroom, Chromebooks support students' learning and teacher's instruction. Twenty-five million students in U.S. schools used Chromebooks as of January 2018 (Hildenbrand, 2018). However, despite the proliferation in schools, only a small amount of research (Abrego-Meneses, 2018; Bartolo, 2017; Loescher, 2018) exists for the Chromebooks' validity as a technology tool to support writing.

There are many studies related to integrating technology into the writing curriculum; however, there was limited discussion about how to utilize technology when teaching elementary-aged students to write. For primary teachers, the focus of writing instruction is generalized to paper and pencil letter formation with a gradual introduction to computers. By third grade, there are higher expectations for educators to incorporate technology into their classrooms; however, much of the research about technology to teach writing focuses on middle and high school students. Although the research was positive in support of using mobile PCs, such as the Chromebook, more research was needed to determine the impacts on student engagement and writing performance.

Theoretical Framework

The theoretical framework of this qualitative action research on the effects of a TBGO and 1:1 Chromebooks on the persuasive writing of third graders was grounded in

8

several concepts and theories. In action research, teachers and other personnel take on the role of researcher and study their own practice within their classrooms and schools (Efron & Ravid, 2013, p. 4). Further, action research's purpose is to either solve a practical problem or at least to find a way to enhance further what is already positive in a practice situation; it is always focused on the improvement of practice (Merriam & Tisdell, 2016, p. 50). Teacher research emphasizes classroom inquiry as a process of reflection, and theory will lead to more informed action (Klehr, 2012, p. 125). Mills (2018) emphasized, "Teacher researchers are committed to taking action and effecting positive educational change in their own classrooms and schools based on their findings" (p. 5). By being a teacher-researcher, I carried out my investigation systematically, reflectively, and critically used strategies appropriate for my research. My goal was to improve my teaching of writing while growing professionally and foster a commitment to solving problems associated with the development of students' writing skills.

Constructivist learning theory incorporates student-centered teaching methods and techniques which contrast with traditional education, whereby knowledge is passively transmitted by teachers to students (McLeod, 2019). The constructivist theory emphasizes that we learn by constructing and reflecting upon our own understanding and knowledge through experience as well as to a philosophical view that knowledge is constructed through interactions with one another, the community, and the environment (Harasim, 2012). Individuals who were associated with the constructivist methodological foundation of this study were Dewey, Vygotsky, and Bruner. Dewey is often cited as the philosophical founder of the constructivist approach. Bruner is considered a chief theorist among the cognitive constructivists, while Vygotsky is the primary theorist among the

social constructivists. Dewey (1938) stated, "Learning is a social activity—it is something we do together, in interaction with each other, rather than an abstract concept." Vygotsky (1978) believed social constructivism learning is a collaborative process, and knowledge developed from individuals' interactions with their culture and society. Influenced by Vygotsky, Bruner (1990) emphasized the role of the teacher, language, and instruction.

Another theoretical concept that provided a foundation for this study was Kearsley and Shneiderman's Engagement Theory (1998). Engagement Theory is a learning theory that highlights a beneficial way to incorporate technology and engage students in a technology-based world. This theory was derived from constructivism's fundamental ideal that learning occurs during meaningful engagement in learning activities through interaction with others. Engagement Theory specifically promotes student activities that "involve cognitive processes such as creating, problem-solving, reasoning, decision-making, and evaluation," in which students are "motivated to learn due to the meaningful nature of the learning environment and activities" (Kearsley & Shneiderman, 1998, p. 22). Further, O'Brien and Toms (2008) offered research establishing a conceptual framework related to the Engagement Theory that emphasizes the significance of "meaningful experiences with technology that is characterized by challenge, awareness, motivation, interest, and affect" (p. 940). The conceptual model of engagement involves different phases through the engagement process, including initiation of engagement, sustaining engagement in a task, disengagement, and potential reengagement. For this study and from an educational point of view, engagement was

seen as the student was attentive, committed, persistent, and found meaning and value in that tasks that made up learning material and activities (Schlechty, 2011, p. 14).

Dual Coding Theory claims that information is easier to retain and retrieve when it is dual coded in verbal and visual form (Paivio, 1971). This cognition theory explains the effects of mental imagery on the mind and memory. According to the Dual Coding Theory, a person can learn new material using verbal associations or visual imagery, but the combination of both used to represent information is processed differently along two distinct channels creating different representations for information that each channel processes (Reed, 2010). Further, the Dual Coding Theory emphasizes that the brain uses both visual and verbal information to represent information (Sternberg, 2003, p. 596). When information is presented in two formats, visually and verbally, students are provided two opportunities to retain information. TBGOs can be used as a tool to help students organize ideas into visual representations using images and words.

Slaughter (2009) stated, "Our world today has become the electronic world" (p. 16). In today's 21st-century classroom, teachers must find engaging ways to teach the current generation of students who have grown up with technology being as constant in their lives and who may need more than traditional lessons and pedagogical techniques to encourage and inspire them to learn. Teachers have a responsibility to provide a new level of instruction that is relevant, effective, and socially engaging for students (Slaughter, 2009). Since technology is pervasive throughout the workplace and society, schools must prepare students with 21st-century skills, which include writing skills to succeed in school and life.

School reforms continue as the Race to the Top (RTTT, 2009), Common Core Standards (CCS, 2010), and Standards of Excellence (2015) established new expectations for students. The increases in grade-level ability in writing that require that students become proficient writers across all genres and disciplines and efficiently utilize technology to plan and produce written work has encouraged teachers to use technology to create authentic writing experiences for students. Additionally, the U.S. Department of Education's National Education Technology Plan (NETP, 2017) identifying the need for 21st-century learning in America, stated the following:

> One of the most important aspects of technology in education is its ability to level the field of opportunity for students. Technology can be a powerful tool for transforming learning and ensure all learners have engaging and empowering learning experiences that prepare them to be active, creative, knowledgeable, and ethical participants in our globally connected society. (p. 10)

As Martinez and Schilling (2010) stated, "Students gain a sense of pride when they complete authentic work that shows their perceptions and newly found knowledge" (p. 17).

This research focused on the examination of third-grade students' persuasive essays composed with a TBGO incorporating a mind-mapping program using Chromebooks. One intention of this study was to test the generalizability of the intervention a TBGO in the prewriting phase when writing a persuasive essay which created the basis for integrating technology to increase student motivation and engagement.

Furthermore, this action research study provided clarity to the utilization of technology to enhance overall growth in writing. With the prevalence of limited writing growth, this study provided evidence to understand what modifications needed to result.

Purpose of the Study

The purpose of this qualitative action research was to determine the effectiveness of a TBGO on student achievement, engagement, and motivation in writing. The study explored the usefulness of incorporating a mind-mapping program, using Chromebooks to assist students when brainstorming ideas for a persuasive essay. Further, this study examined third-grade English language arts students' perceptions of the use of technology to write persuasive essays using a specific writing prompt.

Research Questions

According to Herr and Anderson (2015), "Research questions often start with the students or have big implications for them as beings-in-the-world" (p. 92). Often, it is practical for researchers to pose both the "what" and "how" questions to establish what can be learned for a study because the former (the *what* questions) justify the rationale for conducting an exploratory study and developing a hypothesis and propositions for further inquiry, whereas the latter (the "how" questions) enable researchers to experiment and even gain control and access to behavioral modification (Yin, 2009, p. 8).

These specific research questions are valid because they align with literature reviews presented by previous studies. Thus, the following two questions were vital to the study to validate the need for additional instruction, the analysis of teaching methods, academic achievement, and student motivation. This research employed qualitative methods to answer the following questions:

- Research Question 1: How does the implementation of a prewriting strategy, a technology-based graphic organizer (TBGO) as a prewriting strategy, impact student engagement in an English language arts classroom?

- Research Question 2: What are the students' perceptions of utilizing the TBGO on Chromebooks as a writing tool?

Positionality

Positionality is an individual's understanding of who they are and what their positions are with others. Herr and Anderson (2015) stated, "The degree to which researchers position themselves as insiders or outsiders will determine how they frame epistemological, methodological, and ethical issues in the dissertation" (p. 39). A researcher must restrict their personal, professional, and intellectual stance to ensure the validity of the research is preserved (Rowley, 2003). Educators' awareness of their positionalities, including gender, spirituality, race/ethnicity, and social class, will encourage effective instruction and enhance learning.

My positionality involved identifying with having a strong work ethic, perseverance, and dedication to be a life-long learner. These personal epistemologies influenced my topic of research and encouraged me to explore a subject that can be a challenge for some students: writing. As a student, I did not enjoy writing until my last year in high school, when I took an elective writing class. To me, that writing teacher demonstrated a real passion for writing, and that inspired me to want to write. I am now continually drawn to exploring writing, both personally and professionally, and examining research about writing instruction to gain a better understanding of authentic writing experiences that will inspire students to want to write. Researchers in the field of

education are continually seeking to find ways to make education worth students' efforts, namely, reaching the educational objectives, which include enhancing learning (Avci, 2016).

After exploring deeper into why I selected my topic to research, I realized that I wanted to reinforce a personal dimension and involvement with the topic; in other words, put my stamp on the research. Thus, I elected to utilize a qualitative research approach and acknowledge my own beliefs and commitment to this topic of research. By recognizing my connections and my passion for making a difference in education, I demonstrated reflexivity by disclosing my bias and monitored the potential effects on my research. Additionally, I strived for disciplined subjectivity by acknowledging my values and beliefs related to the study, my experience with the topic, and my relationship with the participants.

For many years, I have worked with students to encourage them to become better writers, and I have worked conscientiously to develop an authentic writing curriculum. Moreover, one area that ignited my passion for making a difference in education was writing, a subject that many educators want to avoid teaching and can be particularly challenging to instruct. The socioeconomic status of the students at my school was the upper-middle class, which contrasted with my upbringing. At times, these students may appear lackadaisical, so I implemented motivational components in my language arts activities to stimulate engagement. Furthermore, the teacher-researcher must be more self-aware of both personal and organizational emotions if they are not to become desensitized to the data that they are not only collecting but living within (Burns, 2012).

My philosophy was comparable with the study conducted by an educator, Fecho (1995), who framed his research as a "hybrid between the traditional dissertation study and studies carried out by teachers on their practice" (Herr & Anderson, 2015, p. 45). My positionality was that of a researcher and practitioner to conduct research using persuasive writing to be collected and assessed using technology (Chromebooks). I selected the planning strategy phase, or prewriting step of the writing process, to analyze as this initial step is critical in writing development and a step that many students would rather skip. Qualitative data was gathered through semi-structured interviews regarding student perceptions about the use of Chromebooks for writing and observations of students using Chromebooks during the prewriting phase of writing a persuasive essay.

Research Design

In this qualitative study, the researcher explored what impact of implementing a prewriting strategy, a TBGO incorporating a mind-mapping program, using Chromebooks to assist students when brainstorming ideas for a persuasive essay, on third-grade students' achievement. Using a phenomenological approach, I wanted to (a) understand how students experience writing using technology; (b) observe students engaging in the writing process using technology; (c) interview students using open-ended questions to allow them to fully describe the experience from their viewpoint; and (d) collect and analyze data to identify themes or make generalizations regarding how students actually perceive the implementation of technology into writing. Creswell and Creswell (2018) defined a phenomenological study as one where the researcher describes the lived experiences of individuals about a phenomenon as described by the participants (p. 13). This study was conducted in the natural classroom setting and included students'

16

interviews and student writing. Glesne (2006) described qualitative research methods as those "used to understand some social phenomena from the perspectives of those involved, to contextualize issues of particular socio-cultural-political milieu, and sometimes to transform or change social conditions" (p. 4).

Qualitative research has specific characteristics. Glesne (2006) described qualitative research methods as those "used to understand some social phenomena from the perspectives of those involved, to contextualize issues of particular socio-cultural-political milieu, and sometimes to transform or change social conditions" (p. 4). It is based on the collection and analysis of non-numerical data such as observations, interviews, and other discursive sources of information (Gay & Airasian, 2000). It tends not to state hypotheses or research procedures before any data is collected. The research methods and problems tend to evolve as the understanding of the research context deepens. Action research, a common form of qualitative research, addresses a specific problem in a practice-based setting, such as a classroom, a workplace, a program, or an organization (Herr & Anderson, 2015, p. 2). Merriam and Tisdell (2016) asserted, "The point of action research is the improvement of teaching practice at the same time that the teacher-researcher develops into more of a reflective practitioner and creates new knowledge about and with her or his students" (p. 54). In this qualitative action research study, I was the primary source for data collection, analysis, and reporting.

<p align="center">**Data Collection, Methods, and Analysis**</p>

Data Sources

The researcher explored the effects of the implementation of a TBGO using mind-mapping, on student writing, and the students' perceptions about writing for all

17

participants. Eight students, three from two third-grade classes and two from one third-grade class, were interviewed to see how they viewed themselves as writers and as to the effects of the implementation of technology on student writing and the students' perceptions about writing.

The teacher-researcher conducted student interviews using open-ended questions following the technology implementation about students' perceptions regarding the use of TBGO as a tool when writing. This allowed the participants to describe the experience from their viewpoint. Additionally, the researcher kept ongoing documentation via journaling throughout the study to document continuous thinking, decisions, and actions. Herr and Anderson asserted, "Action researchers are so close to and involved in the process, that journaling is a way of stepping back into ongoing analysis" (p. 91). Additionally, as suggested by Herr and Anderson, I solicited an educator to serve as a "critical friend" who could provide alternative interpretations as needed during the research.

The intervention implemented involved third-grade students at various performance levels who actively participated in a prewriting strategy, a TBGO incorporating a mind-mapping program, using Chromebooks, to assist students when brainstorming ideas for a persuasive essay. The persuasive essay included the use of the writing process, including the following steps: (a) prewriting, (b) first draft, (c) revising, (d) editing, and (e) final draft. Chromebooks were utilized for students to publish their persuasive essays using Google Documents.

After the completion of the persuasive essay activity, a post-writing interview was conducted by the researcher to assess students' perceptions about writing following the

18

implementation of the technology intervention. The teacher-researcher collected and analyzed data to identify themes regarding how the implementation of technology impacted students' writing and how students perceived using technology with their writing.

Context and Participants

According to the 2017 Georgia Department of Education, Brooksville Elementary (pseudonym), located in Peachtree City, GA, is a school with a population of 492 students in kindergarten through fifth grade. It is part of the school district of Fayette County, in the western part of the county and the southern Atlanta metro area. The third-grade students at Brookville Elementary have consistently performed higher than 80% of the schools in the state and approximately 8% higher than the district on the state standardized testing in Language Arts (GA Milestones).

The teacher-researcher conducted this study on third-grade language arts students at Brookville Elementary School in Peachtree City, GA, during the 2019-2020 school year. The study employed convenience sampling. Convenience sampling, a type of non-probability sampling method, was used for this study because participants were drawn from the population that was readily available. Samples were selected that provided information about the prewriting strategy, a TBGO using mind-mapping, on student writing, and students' perceptions about writing. The target population included third-grade students in one elementary school. The study's sampling frame consisted of an enrollment list for the three third grade classes in the school selected.

Eight students, three students from two third-grade classrooms and two students from one third-grade classroom, were selected for the sampling group. Students were

selected based on teacher recommendations and all third-grade students received the same writing instruction that included the incorporation of a TBGO to assist in the prewriting phase. The participant ratio of the girls to boys was about equal, and students' ages ranged from eight to nine years old. English was the first language for all the student participants in this study.

Per accepted ethical standards, participation in the study was entirely voluntary. Since this study was identified to enhance personal classroom effectiveness of the teacher-researcher, the Institutional Review Board (IRB) did not recommend written, signed consent or assent by the participants or parent/guardian. Therefore, the teacher-researcher followed IRB guidelines to weave the activities of this study into the English language arts curriculum. The teacher-researcher maintained anonymity in final documents, with each participant being assigned a numerical identifier by the researcher. The teacher-researcher kept all information on a password-protected electronic device, locked in a cabinet, accessible only by the researcher. The students and parent-guardian were free to withdraw themselves from the research at any time, without penalty. Any data collected via interviews or journaling was kept confidential and remained on the same electronic device, or in the same locked cabinet, accessible only by the teacher-researcher.

The research was conducted using a specific protocol that yielded observations and data. For this data to be of any use, the data collected must possess specific properties like reliability and validity.

Procedures

To determine the impact 1:1 Chromebook implementation has on student attitudes writing and technology, third graders learned to publish persuasive essays using a prewriting strategy using a technology-based graphic organizer using images and words.

The instruction took place during the third nine-week period of the 2019-2020 school year. The teacher presented material using a TBGO. Student work was conducted digitally through the Chromebook. The data was collected through the length of the writing workshop, which was approximately seven instructional days within the third-grade classroom.

The seven instructional days included specific instruction for each day of the writing workshop. On day one, the teacher-researcher reviewed the writing process steps—prewriting, first draft, revising, editing, and publishing. Additionally, on the first day of the writing workshop, participants were introduced to the persuasive writing topic—what is the best vacation spot? The teacher-researcher asked the participants to think and select the best vacation spot from the following three choices: the beach, the mountains, or a big city. On day two, the teacher-researcher introduced the TBGO and demonstrated how to access and navigate the TBGO via Google Docs. The third and fourth days of the writing workshop consisted of the participants brainstorming for their persuasive essay using the TBGO by adding images and words to provide three reasons to support their opinion. Students typed their first draft of their persuasive essay on days five and six using Google Docs and using their TBGO as reference. Additionally, students revised and edited their first drafts on days five and six of the writing workshop. On the last day, students published their persuasive essays via Google Docs.

To get an overall sense of how students felt about the use of technology when writing, the teacher-researcher asked students to answer open-ended questions about their perceptions about writing, technology, and the use of technology when writing. This provided information about students' perceptions before the implementation of technology. Throughout the study, the teacher-researcher observed students engaging in the writing process with technology implementation. A narrative style of journaling provided detailed descriptions of practices that may be useful and transferable to other settings. Participants were interviewed using open-ended questions following the research study to allow them to describe the experience from their viewpoint fully. The teacher-researcher collected and analyzed data to identify themes regarding how students perceive the implementation of technology into writing.

Student interviews were semi-structured. Open-ended questions were utilized to encourage participants to think about the use of technology in writing, to share their knowledge and experiences about technology, writing, and the combination of both, and to connect their ideas and perceptions about their writing and technology. The use of open-ended questions was the best method for this study because the researcher hoped to challenge students to think for themselves and invited them to share their views of writing and technology. While the teacher-researcher developed interview protocols, she was open to questions that emerged during the interviews, which may happen in qualitative research. Eight students, three from two third-grade classrooms and two from one third-grade classroom, were chosen using convenience sampling based on teachers' recommendation and interviewed to see how they viewed themselves as writers and as to the effects of the implementation of technology on student writing and the students'

22

perceptions about writing. Students were interviewed separately. Interviews were audio recorded for two reasons: to help the researcher obtain a complete record of what is being said and to allow the researcher to focus on the student being interviewed. Audiotapes of interviews were not used for any purpose other than the two stated above, and they will be destroyed no later than three years after the completion of the research project.

Qualitative analytic coding took place in two phases, open coding, and focused coding. Open coding involves reading notes and interview transcripts "line-by-line to identify and formulate any and all ideas, themes, or issues they suggest, no matter how varied and disparate" (Emerson et al., 1995, p. 143). When analyzing data, the researcher reviewed notes and interview transcripts regarding students' open-ended questions to organize them into the categories identified through open coding.

The researcher used qualitative data analysis software, NVIVO 12 PLUS, to store, manage, and analyze qualitative data. This program served as an electronic filing system and allowed the researcher to store interview transcripts, and writing data, as well as code them.

Trustworthiness and Validity

To ensure trustworthiness in this action research and because I recognized my own beliefs and commitments to this topic of research, I disclosed my bias and monitored the potential effects on my research. The practitioner-researchers see research to deepen their reflection on practice toward problem-solving and professional development as well to generate knowledge of practice from the inside out (Herr & Anderson, 2015, p. 38). The persuasive essays were scored using a four-point holistic rubric to demonstrate consistency and validity. Before scoring, any identifying information was removed and

23

marked with an identifying number. Interview data from semi-structured interviews was analyzed through descriptive analysis. Semi-structured interviews are based on a semi-structured interview guide, which is a schematic presentation of questions or topics and needs to be explored by the interviewer (Jamshed, 2014). Additionally, I strived for disciplined subjectivity by acknowledging my values and beliefs related to the study, my experience with the topic, and my relationship with the participants.

Significance of the Study

When educators provide authentic writing experiences, students can make connections to their lives, and the task is meaningful to them. Whitney (2017) offered, "In a writing classroom, the authenticity of teachers and students means showing students what our real, unfinished, in-process writing looks like, and it means engaging in real tasks and writing for real readers" (p. 20). Educational researchers have advocated for authentic learning experiences in K-12 settings and argued that authenticity increases student engagement and achievement, particularly in teaching writing (Dewey, 1938; Fisher, 2007; Freire & Macedo, 1987; Purcell-Gates et al., 2007). Splitter (2009) defined authenticity to mean that "students need to be persuaded of the connection between what they do in school and how they perceive the world, and the connection needs to be meaningful to the individual student." Authentic learning experiences, paired with technology integration, helps to promote 21st-century learning environments.

Technology has increased in everyday lives, and the use of mobile technology has carried over to the educational environment for its perceived potential for increasing student motivation and achievement (William & Larwin, 2016). The prevalence of technology today, it is critical that educators embrace 21st-century teaching strategies to

24

prepare students for the future. Further, along with technology implementation comes the responsibility of preparing students to use technology effectively to support their learning. Pytash et al. (2013) asserted, "Educators find themselves in a significantly changing world where digital technology and multimedia creation have dramatically altered the expectations for reading and writing in K-12 classrooms" (p. 58).

Research studies have identified the benefits of using technology to improve students' classroom engagement (O'Brien et al., 2007; Scherer, 2011), increase students' academic achievement (Storz & Hoffman, 2013), and enhance students' writing (Boas, 2011; Yancey, 2012). In this qualitative action research, students used technology to support their learning by using a TGBO to help brainstorm ideas during the prewriting phase of a persuasive essay.

Limitations of the Study

The findings of this study should be viewed with caution, given the study's limitations. The first identified limitation was the length of intervention dedicated to the study, instruction, and use of technology. The instruction took two days: one day discussing the steps of the writing process and one day instructing using TBGOs on the Chromebook. Allowing students to write the first draft, revise, and edit their persuasive essays took three days. Finally, students took two days to publish their persuasive essays using Google Docs. This writing project stayed on target for the estimated time frame of a total of seven days.

The second limitation of this study was the incomparable groups in terms of comfort with technology. The student participants may have preexisting attitudes, biases, or comfort levels with technology, specifically Chromebooks. Because all students have

25

been assigned their Chromebooks, students who are new to the school district may not have had the exposure to the use of this type of technology.

Another limitation identified in this study involved the interruptions to instruction. Interruptions to instruction may include students' absenteeism, students' related services, students' behavioral issues, or unpredictable occurrences. To conduct research in an authentic environment, the study was implemented at a specific time of the day; however, interruptions to instruction may disrupt learning.

Dissertation Overview

Chapter Two, the literature review, includes an introduction outlining the ideas and theories influencing the study and is organized into five areas of focus when implementing a TGBO as a prewriting strategy to support students with brainstorming in their persuasive writing, including goals, design features, benefits, barriers, and assessment. The theories associated with using technology in the writing curriculum are discussed and include Constructivist Theory, Engagement Theory, and Dual Coding Theory.

In Chapter Three, the methodology is presented. The statement of the problem, research questions, and research design are restated. The participant selection, data collection including tools and instruments, procedure, role of the researcher, and data analysis are also presented.

Chapter Four describes the findings and implications of the Action Research study. The data collection strategy and results pertaining to the research questions are reported.

Chapter Five is the final chapter of the study and includes the data summary, conclusions, and Action Plan as it relates to the stated problem of the study and research questions. Chapter Five consists of an Action Plan that is targeted to the findings and describes future goals for facilitating educational change because of the study.

Terms for Study

Assisted Technology – product system that is used to increase, maintain, or improve functional capabilities of a child with a disability.

Chromebook – a notebook computer based on Google's Chrome OS and designed to access the user's applications, files, and configuration and sending information over the Internet.

Common Core State Standards – an educational initiative, sponsored by the National Governors Association and the Council of Chief State Schools Officers, in the United States, that details standards across states as to what K-12 students should know at the end of each grade in English language arts and mathematics**.**

Connected Classroom – a concept that allows teachers to create a multi-screen ecosystem that goes beyond the classroom and creates a rich educational experience through an online community.

Google Docs – free web-based application in which documents and spreadsheets can be created, edited, and stored online.

Graphic organizers – spatial arrangements of words (or groups of words) or pictures intended to represent the conceptual organization of the text.

Promethean Smartboard – an interactive whiteboard that uses touch detection for user input in the same way as normal PC input devices.

Race to the Top (RTTT) – a $4.35 billion United States Department of Education competitive grant created to spur and reward innovation and reforms in state and local district K-12 education.

Standards of Excellence – an educational initiative that some states adopted in the United States in place of Common Core State Standards that detail revisions relative to CCSS but include outline specific guidelines each state elects.

Technology-based graphic organizers (TBGO) – software programs or web-based programs that support the creation and development of a graphic organizer to be used on a computer.

Touchscreen – input device on an electronic visual display allowing a user to input or control the information processing system through simple or multi-touch gestures with a stylus and/or fingers.

Wi-Fi – wireless technology that allows electronic devices to participate in computer networking.

CHAPTER 2

LITERATURE REVIEW

The purpose of this action research was to examine the impact of implementing a prewriting strategy to assist students when brainstorming ideas for a persuasive essay. A technology-based graphic organizer (TBGO) incorporating a mind-mapping program using 1:1 Chromebooks was employed in the curriculum of a third-grade language arts classroom to measure student achievement. Significant evidence was insightful of the literature topics and supported this study's theoretical framework and methodology.

This literature review includes analysis and evaluation of published literature that identifies best practices for integrating educational technology to enhance student achievement, engagement, and motivation when teaching writing. There are three main topics examined in this literature review. The first topic explored the integration of technology in classrooms to advance and enhance learning experiences. The second topic examined instructional strategies to teach writing in 21st-century classrooms to support student learning. Instructional technology is increasingly being implemented in today's schools through 1:1 Chromebooks. Thus, the third topic of this literature review focused on the impact of using Chromebooks in 21st-century classrooms. This body of literature ensured that the current study was theoretically grounded and aided in the development of appropriate research design.

The most current and relevant evidence related to this study is presented to illustrate the use of Chromebooks to advance and enhance students in meaningful and

authentic activities that develop writing competencies. Studies cited in this literature review are related to 21st-century learning and provided insights into the ways Chromebooks are used in the classroom to support students in their learning. The research problem is explored through an attempt to develop an effective 21st-century framework for student engagement, motivation, and achievement.

Integration of Technology in Classrooms to Advance and Enhance Learning Experiences

The first area of focus for the literature review explored the integration of technology in classrooms to advance and enhance learning experiences. In reviewing the literature dealing with technology implementation in education, it was evident that this has been a major focal point of research since the mid-1990s. Further, technology is rapidly changing our world in the way that we work, communicate, and create. Technology integration is more complex than simply using a technology tool; pedagogical and instructional strategies around the tool are essential for successful learning outcomes (Kolb, 2017, p. 10).

Technology was once thought of as "the wave of the future." Today in 21st-century classrooms, technology is considered "the wave of the present." Educators are challenged with integrating technology into lessons to help students learn. The National Council of Teachers of English (NCTE) defines literacy in the 21st century with more focus on the technologies that are becoming imperative to literacy education. Their definition states the following:

> Because technology has increased the intensity and complexity of literate environments, the twenty-first century demands that a literate person possesses a wide range of abilities and competencies, many literacies. These literacies—from

reading online newspapers to participating in virtual classrooms—are multiple, dynamic, and malleable. As in the past, they are inextricably linked with histories, life possibilities and social trajectories of individuals and groups. (2013)

Educators recognize that part of providing students with the best possible education includes preparing them for the workforce and the world they will enter after they graduate from high school. However, this endeavor may prove to be challenging in this ever-changing digital world. The World Economic Forum (2016) reported, "Sixty-five percent of today's school-aged children will be employed in jobs that have yet to be created" (p. 6). This means educators must anticipate and teach students skills they have never seen and may not see for years to come. Even today's technology skills may be obsolete before students graduate (Miller, 2015, p. 8).

Educators must prepare students to become lifelong learners in a world where technology is continually evolving with new technology and innovations. For students to be prepared for college and career possibilities, they must be digitally and technologically literate. Students' grades, graduation, access to college, and success in the workforce are dependent on their writing skills (Drew, 2014, p. 87). Fletcher (2017) asserted, "When writing in college or the workforce, students may be asked to explain, inform, justify, enumerate, summarize, or describe" (p. 75). Writing instruction appropriate for the world today requires us to consider what new skills and dispositions students might need for the digital age (Devoss et al., 2010, p. 11). Teachers must focus on real-world contexts and focus less on the traditional model of the past. When students are encouraged to learn both independently and collaboratively as well as to utilize the technology that exists in the 21st-century classrooms, they will be better prepared for their future.

Technology can transform the classroom into an interactive learning environment. Educators can use technology to support learning-by-doing and deepen student engagement (Cennamo et al., 2014, p. 60). For example, instead of teachers using exit tickets to assess students' thinking, online journal entries can be used as a digital form of exit tickets to check understanding of the content taught. Using an online notepad, students can write a journal entry to summarize what they have learned. Technology provides an opportunity for teachers to maximize student learning. By utilizing new technologies such as laptops, Chromebooks, iPads, widgets, websites, and educational apps, teachers can differentiate instruction, maximize student engagement, encourage student growth to become productive and positive citizens in the "plugged-in" culture in which we live (Martin, 2016, p. 28). Educators have access to videos, animations, and visuals that make it easier to show students what they are talking about instead of just explaining it.

To select effective applications for classroom learning, teachers need to rely on the effective instructional practices of each content area and look for those practices to be built into the tools (Kolb, 2017, p. 153). For English language arts, technology can provide differentiation for student learning styles by providing an alternative method for achieving conceptual understanding, procedural skill and fluency, and applying this knowledge to authentic circumstances (Murray, 2015). Technology in the classroom allows students to gain a deeper understanding of topics that interest them, collaborate with each other, and direct their learning (Jonson, 2018). Moreover, teachers should recognize the importance of identifying students' interests when developing lessons for the classroom. By utilizing something students are already interested in—technology—

educators have access to something students enjoy and the ability to channel that enthusiasm into learning (Heitin, 2011, p. 34).

Technology is pervasive in students' lives; many students attend school as digital natives (Prensky, 2012); they are familiar with and readily use the latest technologies. Students' enthusiasm for technology, including electronic devices and computerized gadgets, has resulted in educators creating more modern digital versions of traditional evidence-based strategies such as graphic organizers and other direct instruction techniques, but there is limited evidence to measure their effectiveness (Kennedy et al., 2014). The fact that technology is continually evolving creates added pressure for educators to keep up with the demand for knowledge of technology-based instructional strategies.

There are many reasons why students do not like to write or may avoid writing. Some students think writing is not fun or enjoyable, writing is not meaningful or relevant, or it is difficult for them to express themselves via writing. Writing is hard work and learning to write is even harder (Graham et al., 2013). Fletcher (2017) stated, "We learn to write by writing on a daily basis" (p. 4). Students will develop the confidence needed to gain the enthusiasm for writing by being exposed to modalities that help them view writing as more authentic or meaningful (Read et al., 2017). When students are frustrated with individual components related to writing, struggle to get started, or to keep track of their thoughts as they work through the writing process, their enthusiasm for writing often diminishes (Gambrell & Morrow, 2015). Further, teachers must plan for the writing environment, set clear expectations, and make resources and materials available to students to allow them to independently problem-solve (Serravallo, 2017, p. 19). The

positive influences teachers can provide students as their writing develops can help students become more confident, competent, skilled, and thoughtful writers.

The Instagram and Snapchat generation seems to utilize writing more than generations before them in informal ways such as writing abundant text messages and social media posts; however, when it comes to formal writing expected at school, they struggle with the mechanics of simple sentences (Copeland, 2015, p. 87). The way we communicate is changing. Writing instruction that is limited to pencil and paper fails to account for the 21st-century writing process, fails to nurture digital citizenship, and word processing skills needed for success in today's world (DeVoss et al., 2010). As technology continues to change, teachers must also evolve by integrating technology into the classroom using exciting and meaningful writing experiences to engage students and promote writing development. Miller (2015) asserted, "If educators would open their minds to new approaches to how education is done, big changes in schools could drastically accelerate" (p. 17).

There are notable challenges associated with teaching writing in 21st-century classrooms. For many students, writing seems laborious because of the sub-components that must be pulled together and/or the stages of the writing process that must be fulfilled (Culham, 2018). Educators often wonder if writing is a painstaking endeavor because of the slow-pace of its more refined process of written communication in comparison to the fast-pace of today's 21st-century technology, including smartphones, iPads, laptops, computers, and gaming systems (Cennamo et al., 2014). Educators must continue to explore ways to overcome these barriers associated with teaching writing in the 21st century by planning for technology-enriched learning experiences that encourage

students to communicate in written and digital form. Ferdig et al. (2014) asserted, "To effectively teach writing with technology, teachers must have conceptual knowledge of the writing process, pedagogical knowledge about the teaching of writing, and knowledge about how technology can facilitate growth and development" (p. 3).

In education, student engagement refers to the degree of attention, curiosity, interest, and passion that students show when they are learning or being taught, which extends to the level of motivation they must learn and progress in their education (The Glossary of Education Reform, 2016).

Engaging students using technology has many implications for teaching and learning outcomes (Stephens & Ballast, 2011). Additionally, technology has the potential to increase student enthusiasm and engagement (Lorenz et al., 2009), impacting their metacognition and performance, as well as teacher effectiveness and productivity (Jamil & Shah, 2011; Wang et al., 2008). Not only does technology increase student engagement, but the use of technology has also shown to improve the quality and quantity of students' written work (Graham et al., 2012b).

The use of instructional technology gives teachers the opportunity to support learners in the 21st century by allowing them to scaffold their instruction and provide students with challenges that engage all levels of student learners (Hicks, 2013). Technology has flooded our lives. In developing the curriculum, teachers must plan more creatively and resourcefully to make learning more meaningful for students. Graphic organizers assist students in organizing their prior knowledge and reflecting on the material they have learned, so they are ready for the next phase of learning (Cummins et al., 2015). Using graphic organizers allows students the ability to see connections

between ideas and concepts, thus improving their overall comprehension and ensuring readiness for continued learning (Vaughn & Edmonds, 2006).

The development of analytical skills is an important area for educators to emphasize in student learning (Dede, 2010). For example, when brainstorming ideas about a specific writing topic, the ability to consider the whole picture or both sides of an argument is an essential lifelong learning skill. Students need to understand an issue thoroughly and recognize that there is more than one side to an argument. Generating details about a specific topic, as well as weighing the alternatives ideas through a graphic organizer, is a very effective way to guide students and improve these skills. By incorporating a TBGO, students can process information, use higher-order thinking skills to make connections, and reflect upon background knowledge to better understand an entire issue (Nussbaum & Schraw, 2007).

As a prewriting strategy, graphic organizers encourage the organization of ideas (Avery et al., 1996; Guastello et al., 2000; Lee et al., 2007; Meyer, 1995; Unzueta & Barbetta, 2012) which may lead to better organized and higher-quality essays (Ruddell & Boyle, 1998; Zipprich, 1995). Graphic organizers assist writers to sequence or structure their writing by providing a visual representation of their ideas. The use of TGBOs as a prewriting strategy supports critical thinking skills by encouraging students to brainstorm their ideas about specific themes and create a visual representation of their thoughts.

Instructional Strategies to Teach Writing in 21st-Century Classrooms to Support Student Learning

The second topic in the literature review explored instructional strategies to teach writing in 21st-century classrooms to support student learning. More specifically, the analysis of implementing a TBGO as a prewriting strategy to support students with

36

brainstorming when writing a persuasive essay is defined. Ideas and theories regarding students' use of graphic organizers using technology for learning and methodologies used in the field are outlined.

Writing is a skill applied in all content areas. If students are encouraged to put their thoughts into words, they can learn and understand and, therefore, succeed academically. For the elementary and secondary English language arts students, Tompkins (2010) debated,

Writing should be taught and expanded across all core content areas. For the teacher, professional development can be beneficial towards a teacher's own ability to teach writing, provide specific instruction to students, which gives students an opportunity to engage, model, and practice the writing process. (p. 319)

According to research, these key elements tend to improve writing skills and achievement of their students (Graham et al., 2006). Additionally, students need to write logically and accurately. Educators need to focus on supporting students beyond basic levels so that they have a solid foundation of effective writing skills.

Planning for writing requires the student to access topic knowledge, writing strategies, such as format and genre conventions, employ problem-solving strategies, and set goals (Flower & Hayes, 1981). Hayes and Flower (1981) hypothesized that the planning process in writing is driven by a type of fluid goal setting where problem-solving strategies are particularly important for the writer who may be less familiar with the topic and/or less adept at using writing strategies. Prewriting activities can assist the writer to organize ideas and text structure (Brodney et al., 1999; First & MacMillian,

1995; Flower & Hayes, 1981). Next, the writer must then revise their work to include adding, substituting, and deleting text to clarify meaning and edit mistakes, such as correcting errors in mechanics of proper writing (Parsons, 2001). The final product of publishing is done in the celebration of the accomplishment (Graham et al., 2012a). Research has shown that explicit instruction in these processes improves the quality of writing for all students (Graham, 2006; Graham et al., 2012a; Graham & Harris, 2003; Graham & Perin, 2007).

The review of related literature influenced the design of the proposed study. The decision to use a graphic organizer incorporating technology was supported by the continued search by educators for research-based, effective tools to overcome students' ongoing academic difficulties in writing while also taking advantage of the technology available to them in their current, 21st-century classrooms.

In 2003, the *Report of the National Commission on Writing in America's Schools and Colleges: The Neglected "R", The Need for a Writing Revolution,* the authors described the importance of writing and noted the challenge of the integration of technology on teaching and learning of writing. Fast-forward to 2010, where The National Writing Project (NWP) identified that much had changed with what it meant to "write" and "be a writer." Social networking and collaborative writing technologies had evolved where students and teachers created, shared, and distributed writing in more accessible ways.

Gone are the days of traditional classroom environments where students sit in desks aligned in straight rows writing in notebooks with pencils and pens as the teacher scribbles important facts on the chalkboard. Because of the changing content for writing

and with the integration of 21st-century classrooms, it is evident that students need

exposure to information and communication tools for writing (Stephens & Ballast, 2011).

Although some individuals believe students do not write or read often, students do write

regularly (if not daily) via technology, including instant messages, emails, blogs, Twitter,

Facebook, and Snapchat (Hicks, 2013). DeVoss et al. (2010) asserted, "As documented in

the Digital Youth Project, a three-year ethnographic look at young people and digital

media, young people are engaged in a multipurpose, highly participatory, 'always on'

relationship with digital media. School, in contrast, is seriously 'unplugged'" (p. 3).

Students and teachers are documenting the social changes they are experiencing and

noting how technology is influencing how we communicate around the world.

The role and status of digital learning in the 21st century, by both students and

teachers, has moved into the forefront of thinking about pedagogy (teachers' values,

beliefs, and assumptions about education) and classroom practice (Benade, 2015, p. 43).

Educators can explore ways to use technology to create authentic learning experiences for

all students. The roles that teachers and schools play in teaching writing and supporting

literacy have shifted as young people today have an unprecedented level of access to a

wider range of content and connectivity than ever before (DeVoss et al., 2010). Because

most kids today are already confident with the use of technology, connected classrooms

can encourage students to think and solve real-world problems (Cennamo et al., 2014).

Students are interacting with the real world daily, and therefore, developing an

understanding of written language such as specific genres to more conventional written

language and form (Tomlinson, 2014). Students' ideas and intentions take multiple

forms, including notes, lists, journal writing, stories, web postings, text messaging, and

blogging. Pytash and Ferdig (2014) asserted, "Schools are social settings that can provide opportunities for students to talk, dramatize, and draw their way into more sophisticated written language." Teachers should provide students time devoted to writing, multiple opportunities to write throughout the school day, and focused instruction that builds on the writers' efforts. Writing development is connected closely to reading development. When students are immersed in opportunities to read and write, they can form and develop ideas while finding ways to convey their understanding of skills being developed (Gambrell & Morrow, 2015). Teaching writing starts with exposing students to well-written texts. According to a Carnegie Foundation study (Graham & Perin, 2007), one proven way of teaching writing is using models; students begin by reading the mentor text, then analyzing it, then emulating it in their writing.

Educators need to find ways for students to write informally throughout their learning experiences to ensure they are understanding and valuing the important role writing plays in learning (Graham et al., 2013). Actively involving students in the writing process, a strategic process of prewriting, drafting, revising, editing, and publishing, allows teachers to see more clearly which writers need what instruction (Culham, 2018, p. 73). Students take ownership of skills being developed when the writing activities are authentic and meaningful. Anderson (2014) asserted, "We can help students understand that writing makes things possible, no matter what they choose to do in their lives."

One method educators can use to help students plan, organize, and retain information, as well as incorporate technology into their classrooms, is a TBGO, such as mind mapping. For example, in English language arts, specifically writing, the students can use a graphic organizer to link together different concepts, generate more ideas,

organize their thoughts, and use multiple expressions of language to increase language learning and ability (Buzan & Buzan, 2010). By incorporating a TBGO as an organizational thinking tool in the prewriting stage of the writing process, teachers can capture a visual representation of what their students are thinking. Additionally, graphic organizers help students to make connections when generating their ideas, planning a project, or gathering evidence to support research. Further, a graphic organizer is an effective visual technique that represents a topic, idea, or concept with the help of an image or keyword.

Ausubel's "The Psychology of Meaningful Verbal Learning," published in 1963, emphasized that graphic organizers provide learners a method to increase knowledge by building on their current understanding and presenting new information through well-organized, visual models. Cummins et al. (2015) stated, "A graphic organizer can represent a student's background knowledge about a topic, provide a framework for the topic concepts to be learned, deepen the analysis of the topic, and organize newly acquired information about a topic" (p. 14). Further, graphic organizers are great tools to help students improve their writing by helping them brainstorm their ideas about specific topics (Drapeau, 2009, p. 9).

In literature there are many graphic organizers such as concept maps, story maps, semantic maps, cause and effect maps, fishbone diagrams, flow charts, Venn diagrams, K-W-L charts, mind maps, T-charts, and knowledge maps (Hughes, 2004; Newman, 2007; Olson, 2014; Scott, 2011). The mind mapping technique developed by Buzan (Williams, 2012) presents associations among concepts, ideas, and information through a network or non-linear diagram using verbal and symbolic elements (Dhindsa et al.,

2011). Mind maps prompt individuals to be active, focus and think, and provide a specific link and structure in the organization of information in a sensible and meaningful way (Kansizoglu, 2017, p. 141). In addition, a TBGO will provide a visualization of students' ideas while engaging students with possibilities for increasing student achievement in writing (Hyerle & Alper, 2011).

When educating students in the 21st century, teachers must find innovative ways to teach a generation of students who have grown up with technology. In recent years, computer software has been developed to support students and teachers in brainstorming ideas, organizing information, gathering research, making visual associations, and identifying connections (Cennamo et al., 2014). TBGOs, such as mind maps, convert brainstorming ideas into ordered mind maps, allowing students to think creatively rather than linearly (Hyerle & Alper, 2011).

Developed by Buzan in the late 1960s, mind mapping was developed as a note-taking technique to help reveal prior knowledge by encouraging creativity, retention, and effective learning. In this technique, students use the left hemisphere of the brain to reflect their thoughts, and the right hemisphere to utilize visual elements in their maps (Evreki & Balim, 2010). As stated in research conducted by Aykac (2014), using both hemispheres facilitate learning and ensures the retention of knowledge. Batdi (2015) asserted, "Mind maps are maps that help us to use all parts of the brain, reduce the time needed for studying or memorization, and process ideas through flows and associations in diagrams" (p. 63). Moreover, mind maps provide opportunities to approach a problem's solution holistically, and they are a learning tool that enables both the right and left brain to work (Somers et al., 2014).

To create a mind map, an image of a subject or topic is placed in the center, illustrating the subject or topic. Sub-branches associated with the subject are added and reflected visually. Additionally, words rather than sentences are incorporated and added to the mind map, with or without color, for visual impact (Riswanto & Putra, 2012). Paxman (2011) stressed that it is possible to add words, colors, and visual appearances to help the conceptualization and contextualization of the brain's ideas and with other ideas for the most effective mind mapping.

Mind maps can help students brainstorm or think through concepts that have meaning. Brainstorming about a topic using a map enables students to generate new ideas, thus see more connections between existing ideas. The main difference between brainstorming and mind mapping is that ideas are stated verbally in brainstorming, whereas ideas are expressed verbally and visually in mind maps (Kan, 2012).

Often students struggle with writing, including *how* to write and *what* to write (Culham, 2018). Because they help the learner make connections and structure thinking, teachers often use graphic organizers to assist students with their writing. When educators incorporate technology into the writing curriculum, students' motivation increases and they become invested in their learning (DeVoss et al., 2010). TBGOs support students' learning by helping them identify areas to focus within a broad topic (Cennamo et al., 2014). Because they help the learner make connections and structure thinking, teachers often use graphic organizers to assist students with their writing. Graphic organizers, such as writing webs, mind maps, Venn diagrams, and concept maps, support visual learning to enhance thinking skills and improve academic performance in writing and across the curriculum (Cummings et al., 2015). Whether students have

difficulty generating ideas, using elaborate language, or organizing their thoughts on paper, graphic organizers can help them develop fluency and provide organizational structures that will enable them to become more effective writers (Drapeau, 2009, p. 9).

In recent years, studies on graphic organizers, both traditional and technology-based, have been conducted with various age groups in literature. Batdi (2015) found mind maps to have advantages in creative thinking, problem-solving, focusing on a subject, and viewing a subject holistically (p. 63). Kansizoglu (2017) discovered that graphic organizers are considerably effective in academic success compared to traditional teaching methods (p. 156). Al-Jarf (2009) investigated students who used mind mapping software while writing and found that the technology tool proved to be a powerful tool for improving students' ability to generate, visualize, and organize ideas (p. 9).

Although there are some studies based on the effects of graphic organizers on students' achievements, only a limited number on TBGOs focusing on student engagement and motivation were found in the literature. The area of synthesis of the research regarding the impact of a TBGO on writing could benefit from increased research. In this paper, the teacher-researcher aims to investigate the impact of mind mapping techniques using a TBGO during the prewriting phase of a persuasive essay on students' engagement and motivation.

Impact of Using Chromebooks in 21st-Century Classrooms

The third area of focus for the literature review impact of using Chromebooks in 21st-century classrooms. In addition, the literature review distinguishes what research has been conducted in studying Chromebook use on student achievement in writing from what has yet to be done in the field of research. The historical context of Chromebooks

and student achievement is articulated, and a rationale for the significance of the research is established.

No Child Left Behind Act (NCLB) was passed into law in 2001 by President George W. Bush. The NCLB law "included a recommendation that by the eighth grade all students should be technologically literate and repeatedly referenced technology as an important source of support for teaching and learning across the curriculum" (Culp et al., 2005). The NCLB sought to encourage educators to use technology to enrich the curriculum and their instructional practices.

The role of technology in schools progressed into initiatives in school districts to integrate technology, including 1:1 Chromebooks. States across the United States drafted legislation to provide incentives for school districts to adopt 1:1 initiatives to ensure a technology device for every student in every district. As 1:1 initiatives gained traction, higher percentages of schools began to implement a wide variety of 1:1 initiative programs (Downes & Bishop, 2015). Further, in 2012, at the federal level, the United States Department of Education and the Federal Communications Commission unveiled a plan to switch schools to digital textbooks by 2017 (Zheng et al., 2014, p . 279).

Research supports the use of digital technology as a tool to maximize instruction since its inception in the 1980s (Keppler et al., 2014). Technology has advanced to include smaller and more powerful mobile devices such as smartphones, tablets, and laptops, such as the Chromebook. One-to-one devices have created a significant impact on schools. Chromebooks have rapidly expanded in American schools during the past five years (Ahlfeld, 2017, p. 285). Google-powered laptops, including the Chromebook, are now being used in schools across the nation. Today, over twenty million school

45

children use Chromebooks in classrooms across the United States and Google claims that its technology allows teachers and students to "achieve more together" (Google Education Team, 2017). Further, Chromebooks account for more than half the mobile devices shipped to schools in the United States (Singer, 2017).

Technology can transform the classroom into an interactive learning environment. Additionally, technology can be a powerful learning tool if utilized to deepen students' engagement and motivation in a meaningful and authentic curriculum. As districts and schools implement technology initiatives, careful planning must take place to ensure successful programs. For many school districts, financial constraints have driven the decision to purchase Chromebooks since they are easy to use and inexpensive. Chromebooks are cost-effective, easy to use, convenient, and allow students to build keyboarding, research, and collaborating skills, which are required by state standards (Fink, 2015, p. 36). For example, a Chicago school district was able to save money and energy by eliminating the use of computer labs through the implementation of a one-to-one initiative of laptops and Chromebooks (Bendici, 2018).

With the changes in the requirements of technology skills in education, and the development of innovative technological devices such as the Chromebook, the use of technology in the classroom has come a long way (Kaur, 2020, p. 26). However, technology alone cannot improve education for students unless teachers use technology effectively with pedagogy (Currie, 2016). For teachers to effectively integrate technology in the classroom, it is essential to provide teachers with professional development. Providing the needed support and training can help teachers develop technologically enhanced teaching strategies and increase the likeliness of integrating technology in the

46

classroom (Young, 2016). Moreover, with the rise in technological innovations and the increasing amount of funding that is invested in 1:1 initiatives, it is crucial to find ways to use technology in the classroom by providing teachers professional development opportunities that support successful technology integration (Kaur, 2020, p. 27).

Theoretical Framework

The review of literature related to this phenomenon has contributed to the theoretical framework for the design and administration of this action research study. The theoretical framework design informed and guided the research process and has served to inform the methodological design and the development of the data collection instruments to be used in the field. Additionally, the theoretical framework serves as a key to understanding how data will be collected, and the findings and interpretations are aligned to reflect the theoretical framework.

The wealth of research conducted regarding effective teaching practices that encourage educators to use a variety of instructional strategies to meet the diverse needs of all learners is readily available. However, students learn differently than they did even a decade ago, and teachers are charged with empowering 21st-century students not only to learn but also maintain interest and engagement in school while developing critical thinking skills to increase global awareness. Educational frameworks for technology and language arts are continually changing, and educators must create meaningful, authentic, and engaging lessons to meet the needs of all learners in 21st-century classrooms. Further, approaches to teaching and learning to enhance student achievement, engagement, and motivation must evolve to connect curriculum with technology.

Some theories lend support to the use of technology in the language arts curriculum, including the use of a TBGO to help students process and organize information during the prewriting phase of a persuasive essay. The theoretical framework for this proposed study is a combination of the following concepts and theories: Constructivist Theory (Bruner, 1990; Dewey, 1933; Vygotsky, 1978); Engagement Theory (Kearsley & Shneiderman, 1998; O'Brien & Toms, 2008); and Dual Coding Theory (Paivio, 1971).

Constructivist Theory

The fundamental principle of constructivism is that students learn by doing rather than observing. Students bring prior knowledge into a learning situation in which they must critique and re-evaluate their understanding of it. Constructivists believe that students should be provided with opportunities to think for themselves and articulate their thoughts. Further, students construct their meaning by building on their previous knowledge and experiences. Thus, new ideas and experiences are blended with existing knowledge, and the student constructs a new understanding to make sense of the world. Constructivism is an approach to teaching and learning based on the premise that cognition (learning) is the result of mental construction (Olusegun, 2015, p. 66).

Dewey (1933), regarded as the philosophical founder of constructivist theory, believed children learn best when they interact with their environments and are actively involved in their learning. Additionally, Dewey maintained that children should be given opportunities to engage in areas of interest, which allowed the child to be active in his/her learning. Regarding the role that interest plays in children's learning, Dewey stated, "Interests are the signs and symptoms of growing powers" (Flinders & Thornton, 2009, p.

48

39). If children are to become interested in what they are learning, three characteristics must be present: (a) children must be actively learning, (b) learning must be based on real objects, and (c) the task must have high personal meaning (Schiefele, 1992).

Vygotsky developed social constructivism. Vygotsky (1962) asserted, "The child's cultural development appears on a social and individual level" (p. 57). Additionally, Vygotsky emphasized the idea that teachers could not merely transmit knowledge to students; instead, students must actively construct knowledge in their minds. He advocated for students to discover and transform information, check new information against prior knowledge, and revise understanding as new information is processed. Further, a constructivist learning environment must provide the opportunity for active learning, including concentrating on learning how to think and knowledge shared between teachers and students (Tam, 2000, p. 15).

Influenced by Vygotsky, Bruner emphasized that "learning is an active, social process in which students construct new ideas or concepts based on their current knowledge" (Forgas et al., 2013, p. 24). He believed that different processes were used by learning in problem-solving and that social interaction is the foundation for learning. In addition, Bruner maintained that learning should be a process of discovery where learners build on their knowledge, with an active dialogue between teachers and students, and building on their existing knowledge.

This action research study is grounded in the constructivist theory of learning by incorporating learning activities (writing) in an authentic, real-world context (technology) to engage and motivate students to communicate their ideas using a TBGO during the prewriting stage of a persuasive writing project. Jonassen (1994) asserted,

"Constructivism taps into and triggers students' innate curiosity about the world to discover how things work and to become more engaged in their learning" (p. 35).

Engagement Theory

Engagement from an educational perspective is identified as learner participation and interaction with the learning material, activities, and community. The fundamental underlying idea of Engagement Theory is that "learners must be collaborative participants in meaningful and relevant learning experiences and engaged in tasks that extend beyond the classroom if student engagement and authentic learning are intended goals" (Kearsley & Shneiderman, 1998, p. 20). The Engagement Theory is based upon the idea of creating collaborative teams that work on projects that may be meaningful to someone outside the classroom. There are three core components of the theory summarized by relate, create, and donate. The relate component focuses on teamwork, create emphasizes creativity and purpose, and donate stresses the usefulness of the outcome. Further, Kearsley and Shneiderman (1998) offered the Engagement Theory as a framework for technology-based teaching and learning. They asserted, "The effective use and integration of technology within the classroom could serve to enhance learning possibilities not otherwise possible" (p. 22).

O'Brien and Toms' conceptual framework defining user-engagement with technology explored the experiences of users interacting with technology-based systems. According to O'Brien and Toms (2008), "Engagement is a quality of user experiences with technology that is characterized by challenge, aesthetic and sensory appeal, feedback, novelty, interactivity, perceived control and time, awareness, motivation, interest, and affect" (p. 938). This conceptual framework connects with the Engagement

50

Theory on the importance of the self-directed, meaningful involvement with materials or applications based on cognitive challenge and motivation (p. 942).

Dual Coding Theory

Dual coding is the process of combining verbal materials with visual materials. This theory, published by Paivio in 1971, attempts to give equal weight to verbal and non-verbal processing. Paivio (1986) stated, "Human cognition is unique in that it has become specialized for dealing simultaneously with language and with nonverbal objects and events" (p. 53). Dual Coding Theory recognizes two separate but interrelated systems for processing information (Ellis & Ellis, 2008). One system is specialized in processing non-verbal imagery, and the other is specialized in dealing with language. Although independent of one another, the connections between the two systems allow for the dual coding of information. The visual system specializes in processing and storing images, while the verbal system processes linguistic information. Dual coded information is easier to retrieve and retain because of the availability of two mental representations, verbal and visual, instead of one (Saavedra, 1999). The more students use both forms, the better they can think about and recall information (Marzano et al., 2001). When teachers provide students with the same information in two formats—words and visuals—it gives them two ways to remember the information. When students learn something new, they must be able to retain the information for later use. Graphic organizers make it easier for students to link new information to existing knowledge to better understand new concepts.

The theoretical foundations of Dual Coding Theory have definite implications on the value and use of graphic organizers (Wills & Ellis, 2008). Marzano et al. (2001)

51

stated that graphic organizers "enhance the development of non-linguistic representations in students and therefore, enhance the development of that content" (p. 73). As a visual tool, graphic organizers help students process and remember content by facilitating the development of imagens, which are processed and stored images. As a linguistic tool, text-based graphic organizers enable the development of logogens, which are stored linguistic information. Moreover, graphic organizers, such as mind maps, are an effective way students can visually represent material about specific topics by combining images and words.

Technology-based tools help provide visuals and multimedia resources to aid different learning styles (Pytash & Ferdig, 2014). Graphic organizers provide students with the framework for relating existing knowledge to the new information learned (Ausebell, 1963). Digital tools that support learning are TBGOs, such as mind mapping, that can provide compelling introductory materials that will help students focus on the essential concepts and themes that will prepare them to learn (Pitler et al., 2012). Educators can use mind mapping as a unique digital tool that aligns with the outcomes desired when asking students to brainstorm their ideas for a writing project (Buzan & Buzan, 2010). Additionally, TBGOs can encourage students to demonstrate their understanding of a topic and deepen their knowledge during the prewriting phase of writing.

Historical Perspective

Standards Movement

The "Standards and Accountability Movement" began in the United States in the 1990s, where states began creating standards outlining what students were expected to

know and be able to do at each grade level. Assessments were designed and implemented to measure whether students were meeting these specific standards (Gibbs & Howley, 2000). In 1996, Achieve Incorporated established the American Diploma Project, which outlined specific criteria for students to obtain a high school diploma. The goal of the American Diploma Project was to raise academic standards, align high school graduation requirements with the skills young adults needed to do well in the workforce and higher education, improve assessments, and strengthen accountability in all 50 states (Jerald, 2006). Achieve, Inc.'s 2004 report, *Ready or Not: Creating a High School Diploma That Counts*, claimed that "current high-school exit expectations fall well short of employer and college demands" (Dalien, 2014). These concerning facts charged schools to develop appropriate skill sets in their students with a focus on developing life-learning and employability (Benade, 2015, p. 42). The United States graduation rate rose from 79% to 84.6% from 2011 to 2017, even though test scores remained relatively flat (National Center for Education Statistics, 2017). Furthermore, the high school diploma was thought to have lost its value because graduates could not compete successfully beyond high school and needed a set of common rigorous standards (Wiggins, 2011).

In 2010, the Common Core State Standards (CCSS) were adopted by 42 of the 50 U.S. states and the District of Columbia. Standards were released for mathematics and English language arts, and states were given an incentive to adopt the Common Core Standards through the possibility of competitive Federal Race to the Top grants (CCSS, 2010). By requiring students to learn three types of essay writing—argumentative, informational, and narrative—the Common Core State Standards staked a claim for writing after the era of No Child Left Behind, the 2002 federal law that largely

overlooked writing in favor of reading comprehension assessed by standardized multiple-choice tests (Goldstein, 2017). Although starting as a fast trend and a motivator for educational reform, the CCSS curriculum lost momentum and found states introducing legislation to prohibit implementation. Stotsky (2012) asserted, "The implementation of the Common Core State Standards has had limited measurable improvement, and students continue to arrive on college campuses needing remediation in basic writing skills." Although CCSS offers an opportunity for teachers across the United States to focus on the importance of teaching writing, "The Standards provide only a partial picture of good writing instruction and seems to encourage a skill-and-drill approach to writing instruction" (Zemelman et al., 2012). Furthermore, the focus should be on utilizing the writing process and teaching from the approach of authentic and relevant writing instruction.

Technology Implementation

Technology is pervasive throughout the workplace and society; therefore, schools must prepare students for the 21st century with the necessary skills to be successful in school and life. The increases in grade-level ability in writing that require students to become proficient writers across all genres and disciplines and efficiently utilize technology to plan and produce written work has encouraged teachers to use technology to create authentic writing experiences for students (Chang, 2016).

While observing students writing, Graham et al. (2013) noted that writers proceed through a set of distinctive thinking processes, which includes a higher-order system of organization and that writers create macro and micro goals to complete the writing tasks. Flower and Hayes (1981) were the first to develop a model of writing that showed the

54

nature of the writing process. They emphasized the idea that writers worked through the significant steps of the writing process: (a) brainstorming, (b) prewriting, (c) drafting, (d) revising, and (e) editing. Prior to their work, researchers believed writing was a linear process where writers progressed without returning to the previous step (p. 366). Additionally, this idea supports the notion that good writers understand the audience, purpose, and their own goals for writing (p. 372).

To prepare students for 21st-century writing demands, schools need to shift toward attention to improving writing instruction, especially in digital environments (Ferdig et al., 2014). In addition, educators must teach 21st-century skills necessary for students to be responsible in the digital world in which we live. The real-world connection and authentic learning made possible by the integration of technology into the classroom enhances the unlimited possibilities for students to explore, connect, create, communicate, and learn. The fluid and complex nature of writing is enhanced when words, music, animation, movies, and audio add to a palette that previously only offered words and a canvas that only offered paper (Stephens & Ballast, 2011). Today's students often referred to as digital natives, have grown up with technology being an integral part of their lives. Therefore, educators must find ways to incorporate technology into the writing curriculum to foster student growth and development.

To effectively teach writing with technology, teachers must have conceptual knowledge of the writing process, pedagogical knowledge about the teaching of writing, and knowledge about how technology can facilitate growth and development (Ferdig et al., 2014). Learning to write is important to academic achievement and success in life. Writing instruction appropriate for the world today requires us to consider what new

skills and dispositions students might need for the digital age (DeVoss et al., 2010). As teachers prepare students to navigate in the 21st century, they must challenge themselves to find methods and strategies that will increase their sense of self-efficacy for teaching writing as well as support and encourage their students to become effective writers.

Learning to Write

Historically, writing had been viewed as a solitary activity; however, with technology integration and increased social influences, students are encouraged to learn about the world around them, and writing is viewed as a tool for learning (Bangert-Downs et al., 2004). When writing instruction encourages students to learn by conducting rich and relevant real-world inquiries and explorations to promote deep learning, they can make important connections to the world around them (Simkins et al., 2002). Writing instruction in an interdisciplinary environment has students engaged in every stage of the writing process from research to revision and encourage students to publish their work for an outside audience. When students post content online for outside audiences, writing becomes much more important and relevant to them (Demski, 2012, p. 28). Students are more likely to invest time and effort in their writing if they know their work will be viewed outside the classroom, shared with peers, or published online or otherwise celebrated by an audience in addition to their teacher.

Teaching Writing

Writing instruction must prepare students to communicate effectively in the 21st century. Despite the integration of technology and students' desire to use technology during writing, researchers have noted "much of what counts as good writing in schools does not reflect evolving notions of text" (Hudley & Holbrook, 2013, p. 500). Research

conducted by Applebee and Larger (2011) offered, "For the most part, technology seems to be reinforcing traditional patterns of teacher-centered instruction rather than opening up new possibilities" (p. 23). Teachers are more inclined to integrate technology when there is a clear connection between technology-based activities and curriculum standards (Karchmer-Klein, 2007b). However, with the ever-changing advancements in technology, comes concern from educators about the lack of professional development about using the new technologies. Research reveals that many teachers have only a vague idea of what technology integration should look like in the classroom (Hutchinson, 2009). Graham et al. (2013) asserted, "The teacher is the most influential player when it comes to utilizing technology in the classroom to support writing instruction. That is, technology integration is only effective as the lesson developed by the teacher" (p. 329). Writing should be a daily routine and implemented across the curriculum and by grade levels. Furthermore, there is a need for a variety of writing instruction so that data collected can lead to informed decisions about what contributes to best practices.

Best practices in teaching writing require teachers to establish a positive atmosphere for writing, reading, and learning (Culham, 2018). Educators can create a motivating and inviting writing environment by promoting writing for real audiences, encouraging personal responsibility and ownership of writing projects, promoting student interactions, and encouraging self-reflection and evaluation (Graham et al., 2013). Additionally, creating a context for writing includes creating a physical environment that is rich with words for students to use when they write (Morrow & Gambrell, 2011, p. 302). Furthermore, Fletcher and Portalupi (2001) asserted, "We know that young writers work best when they feel a sense of ownership—personal investment—in their writing.

57

We want them to care about their writing, to have a this-really-matters-to-me-feeling as they write" (p. 23). The relationship between teacher and student affects the learning environment in positive ways, which can encourage student engagement associated with achievement outcomes.

Moreover, teachers should share their own writings with their students to model the process and techniques that are required for developmental writing skills. Rimm-Kaufman and Sandilos (2011) asserted, "When students are engaged in a balanced, comprehensive writing program that incorporates a formulated writing process, the outcomes are rewarding for student and teacher." Furthermore, when teachers set the stage for writing, students will become motivated to write by using their voices, passions, and imaginations and thus become confident in their writing.

Teachers' Concerns About Writing

With the ever-changing advancements in technology, comes concern from educators about the lack of professional development when using the new technologies in the classroom. Research reveals that many teachers have only a vague idea of what technology integration should look like in the classroom (Hutchinson, 2009). By providing educators with technology professional development, teachers can feel more confident and comfortable when implementing technology in their classrooms. Furthermore, training should help teachers develop a clear vision of what technology integration in writing instruction looks like (Pytash et al., 2013, p. 141).

The Common Core State Standards (2010) mandated assessments and accountability issues have caused some teachers to reduce the time for writing, teach writing artificially, and fragment the curriculum (Gambrell & Morrow, 2015, p. 295). In

addition, the Common Core State Standards specified the importance of rigorous writing; however, teacher education and training remain a necessity. Limited professional writing development has caused some teachers to lack the confidence needed to teach writing effectively. According to Kate Walsh, president of the National Council Teacher Quality, teacher preparation programs turned up little evidence that the teaching of writing is being covered in a widespread or systematic way (Richmond, 2013). In 2016, a study of nearly 500 teachers in grades three through eight across the country found that fewer than half had taken a college class that devoted significant time to teaching of writing, while fewer than a third had taken a class solely devoted to how children learn to write (Troia & Graham, 2016).

Additionally, given their lack of preparation, only 55% of respondents to that survey said they enjoyed teaching writing. Also, in a research study of schools of excellence in teaching writing, Applebee and Langer (2011) found in 260 English, math, social, and science classrooms of 20 middle and high schools, limited writing was observed and simple one-right-answer kinds of responses or formulaic writing to prepare for standardized tests prevalent over authentic writing instruction. Moreover, the multiple demands of teaching in these standardized-assessment-driven times have caused teachers to struggle to implement writing instruction (Townsend et al., 2013, p. 75).

Getting students to enjoy the process of writing is vital, but educators are often limited by the resources needed and have little time to create them. Teachers regularly have professional development and resources to support instruction for reading and math; however, most teachers are not receiving the support and tools they need to lead strong writing lessons (Mathew, 2018). Providing teachers with the training, support, and the

tools needed to lead strong writing lessons is critical to growth. Troia and Graham (2016) asserted, "Most teachers are great readers; however, when you ask them about their comfort with writing and their writing experiences, they don't do very much or feel comfortable with it" (p. 1725).

Concerns Regarding Students and Writing

Many educators report that students who can produce text on their cellphones are unable to write or type effectively on a laptop, desktop, or in a paper notebook because they are attached to their mobile devices (Kuznekoff & Titsworth, 2013). Communication on a smartphone often requires writers to overlook rules of grammar and punctuation. Students need to learn how to transcribe both by hand and through typing on a computer. Before writing paragraphs, which is now often part of the kindergarten curriculum, children need to practice writing sentences. Teachers must model good writing and provide clear feedback to students about their writing. Culham (2018) stated, "Teachers must help students learn to revise and feel that they can face writing challenges with skill, knowledge, and confidence" (p. 118). When students have confidence in their writing, they can perform better.

Concerns About the Use of Technology

Technology can address some challenges educators face in building stronger writers (Pytash et al., 2013). Because many students are reluctant writers, teachers must find interesting ways to inspire students to want to write. Many students prefer to write using technology versus paper. Software that supports writing, such as Google Docs and Slides, allows students to be creative and the ability to revise and edit their writing more easily (Cennamo et al., 2014).

60

Many school districts have adopted initiatives to improve students' performance, achievement, and engagement in English language arts and take classrooms into the 21st century (Benade, 2015). Research shows that students who use laptops regularly outperform their peers in four areas of writing: (a) content; (b) organization; (c) language, voice, style; and (d) mechanics (Silvernail et al., 2011). By incorporating web-based applications or writing assessment software that assesses students' writing skills and provides suggestions for ways to improve their writing, educators can encourage students to be self-motivators for writing, editing, and reviewing (Pytash et al., 2013). Writing itself is a higher-order area of the curriculum in terms of thinking (Olthouse & Miller, 2012). If students do better at writing, they'll do better across the board in other subject areas (Demski, 2012, 26). Furthermore, by incorporating purposeful technology into the writing process, educators can help students improve their creativity, engagement, and achievement in writing.

Additionally, technology can assist and support teachers when evaluating their students' writing. Many educators express the amount of time it takes to evaluate student writing effectively is cumbersome and tedious, not to mention subjective (Pytash et al., 2013). If states and districts provide a measure for writing identifying a consistent writing rubric or student exemplars, grading can be much faster and more objective. Furthermore, implementing a consistent way to track student writing digitally will assist district leaders who rely on state assessment data on writing performance. Technology can make evaluating and tracking writing easier and more effective (Stosic, 2015).

Social Justice

The simplest definition of literacy is the ability to read and write; however, there are four strands that make up literacy: (a) speaking, (b) listening, (c) reading, and (d) writing (Moody-Zoet, 2014). We use our literacy skills every day, which include checking emails, following road signs, giving presentations, completing homework, ordering from a menu, listening to instructions in class, updating our Facebook status, or texting a friend. Literacy plays an important role in our daily lives and can affect our confidence, social skills, and/or career prospects (Gambrell & Morrow, 2015). Literacy is an authentic and complex social justice issue as it determines many of the factors that contribute to a student's future quality of life (Gunn, 2018). Across America, teachers have articulated, especially those in low-income schools, that some students arrive to their classrooms reading well below grade level each year. Additionally, with the overwhelming challenges schools face in the 21st century, educators often face a wide range of grade levels and competency mastery levels within the same classroom (Benade, 2015).

Literacy is a key foundation for success in a person's life, just as critical thinking skills acquired through math instruction are vital to a person's ability to serve as a functioning member of society (Bakken et al., 2017). By developing critical thinking skills that focus on reading and writing, teachers can help their students invest in their future in a positive and productive way. However, research has shown that kids are reading less than they did in the past. As students age from elementary school to high school, most students who previously read frequently for enjoyment give up the practice (Simons, 2015).

Merely having an educational system does not guarantee improving literacy in America. Americans must adopt a culture of literacy (Petrone, 2013). We know that giving children access to good books has a positive impact on how much children read and their attitudes toward reading as well as writing and speaking abilities. Adolescents entering the adult world in the 21st century will read and write more than at any other time in human history. They will need advanced levels of literacy to perform their jobs, run their households, act as citizens, and conduct their personal lives (Vacca, 2013).

With only 37% of high school graduates in the U.S. reading at or above proficiency (NAEP, 2015), educators must find ways to improve student achievement in literacy, including reading and writing. We must meet children where they learn and how they learn (Levi, 2018). Many of today's students can attain information at their fingertips and are considered digital natives. Educators must provide their students with engaging and multi-platform opportunities that support a culture of literacy (Pitcher et al., 2010). Educational strategies that embrace more diverse or personalized learning that boost literacy, such as various technology, help support student motivation, engagement, and achievement (Cennamo et al., 2014). For example, in any one classroom, there may be students of various abilities, students who require physical, mental, or emotional support, or students of various cultures or limited English proficiency. All these students matter, and educators are charged with providing learning activities to support the students' diverse learning styles, working strategies, and abilities.

Larry Cuban (2001) offered a rationale that supports the techno-idealistic educational reform in the United States by stating, "Change makes a better society. Technology brings about change. Therefore, technology makes a better society" (p. 29).

There is tremendous pressure on educators and school districts to show students'
academic success, often using traditional educational practices.

The history of public education in America is a story of competing and often
contradictory goals of "shifting priorities" and "pendulum swings" (Labaree, 1997, p.
34). Further, Larabee argued that education must be reestablished as public and prioritize
the competing, traditional American goals of democratic equity and social efficiency by
asserting, "The view that education should provide everyone with the capabilities
required for full political participation as informed citizens, and the view that education
should provide everyone with the capacities required for full economic participation as
productive workers" (p. 51).

With the pressures of 21st-century classrooms, teachers, students, and schools are
urged to "keep up or get left behind." The sociotechnical presence in our schools today
reinforces the idea that technology is not merely an instrument of instruction, but rather a
value-laden, totalizing force that dominates and instrumentalizes the substance of our
culture and society (Labaree, 1997). By acknowledging that technology is value-laden,
we can accept that technology is used to change the game in favor of the powers that be.

Educational change involves assessing the goals of equity and social justice.
Educators, as change-makers, must shift the focus from "technology for all" to
"technology for what" (Levitan, 2016). In 21st-century classrooms, technology access and
participation are prevalent where many school districts have adopted connected
classrooms incorporating technologies as tools to stimulate curiosity and inspire students'
desires to learn (Pytash et al., 2013). Laptops, tablets, mobile devices, and Smart Boards
provide real-time information and motivate students to make discoveries. The practical

significance of a state-of-the-art perspective on technology and education is often limited, tending to underplay social influences and relations and offering little useful insight into how present arrangements may be improved or ameliorated (Selwyn, 2010, p. 69). From a critical perspective, by viewing technology not as state-of-the-art but rather state-of-the-actual, educators can think of technology as a tool for possibilities to help attain goals of equity and social justice.

Critical pedagogy has evolved since Paulo Freirie's (1970) publication, *Pedagogy of the Oppressed*, and the national focus on civil liberties (e.g., Giroux, 2004), specifically regarding inequities within the educational system. Educational technology is often thought with regards to its transformative potential to personalize teaching, to encourage students to be in control of their learning, to continue to move schools into the future, and to prepare youth for the real-world. With the prevalence of technology, the power of digital tools for everything from blogging to media creation, low-socioeconomic students can be empowered to change the policies and conditions that once limited their opportunities for success (Kim et al., 2017). There is much potential for technology to enhance the social justice and equity goals of education in our 21st-century classrooms.

Conclusion

The literature review reflected views referencing the importance of utilizing technology in the writing process. Research cited in this literature review reiterated the need for educators to find ways to incorporate technology in the classroom. The overwhelming ideas in this review articulated the necessity for educators to provide more opportunities and strategies to increase students' motivation, engagement, and

achievement in writing. By using technology to support writing, students can develop ideas by creating graphic organizers and visual cues to produce sentences, paragraphs, and essays. Technology is central to how students think and act in the world, and literacy is central to education. By using different modalities to learn, we are allowing our teachers to give students the chance to understand pedagogical approaches that better integrate new literacies (Martin, 2008). Research indicates that the use of technology encourages students to enhance their writing abilities. The literature presented in this study agreed that the integration of technology into the writing process supports the development of writing skills and highlights the 21st-century classroom initiative. The literature review provided information from many studies. The insight gained from resources about writing instruction, using graphic organizers including mind mapping, digital writing, and literacy, provided support of the critical need for students to develop the aptitude, disposition, and desire to write to be successful in school and life. Chapter Three offers contributory factors, including the methodology, research design, and procedures used to implement a study of the integration of technology to enhance writing instruction.

CHAPTER 3

METHODOLOGY

Today, students have been surrounded by technology-saturated environments for most of their lives. In today's 21st-century classrooms, students must be exposed to technology-enriched environments where learning opportunities are provided to emphasize critical thinking skills, communication, and progressive technology use. To help teachers better educate students, many school districts across the nation have implemented one-to-one technology, including providing students with Chromebooks. Teachers can interact with students through this technology and provide innovative learning opportunities. Studies have shown a positive impact on learning when students are engaged in inquiry, analyze content, construct knowledge, and effectively communicate their learning.

A review of the literature offered evidence of how technology has been used to engage students in authentic and meaningful activities that develop writing competencies. The use of technology, specifically Chromebooks, provides creative opportunities to support students' cognitive development. Previous studies of student engagement and attitudes when using technology in writing presented evidence in different learning environments. Additionally, the potential negative impact on student learning regarding pedagogical alignment was also considered.

Chapter Three provides specific information about the action research intervention, data collection, and analysis related to the implementation of technology as

67

a prewriting strategy at an elementary school in a highly rated public-school district. Moreover, the current study examined the impact of writing instruction using a technology-based graphic organizer and a Chromebook on the persuasive writing essay scores of third-grade students. Specifically, the attention of Chapter Three focuses on the following areas: (a) purpose of study, (b) research questions, (c) research design, (d) target population and sample, (e) data collection and analysis, (f) limitations of the research design, (g) credibility and transferability, (h) expected findings, and (i) ethical issues.

Statement of Problem

With the implementation of a district-wide 1:1 technology initiative where all students in grades two through twelve were issued an individual Chromebook, educators in my school were charged with providing students with 21st-century skills to help prepare them for the future. Specifically, students need writing skills to be successful in school and life; however, three out of four students are not meeting grade-level proficiency in writing (NAEP, 2011). Additionally, the NAEP will release national and state results for the 2017 writing assessment in the summer of 2020.

Teachers must find engaging ways to teach this current generation of students who may need more than traditional lessons and pedagogical techniques to encourage and inspire them to learn. However, the task of improving writing or integrating technology into the classroom in a meaningful and state-of-the-art way can be challenging. Hicks (2013) offered, "Technology plays a role in the process [of writing], and there is not a writer in our classrooms today who will not be producing something with a digital writing tool in her or his lifetime" (p. 25).

School systems are increasingly embracing technology initiatives in hopes of motivating students to learn in technology-infused environments. For educators, this means blending proven pedagogy and curriculum with technology integration in innovative, meaningful, and engaging ways.

The purpose of this qualitative action research study was to implement a prewriting strategy, a technology-based graphic organizer (TBGO) incorporating a mind-mapping program, using Chromebooks to assist students when brainstorming ideas for a persuasive essay. Additionally, this study contributed to the limited empirical research for the integration of TBGOs using a mind-mapping program. For the supplemental authentic writing activity, third-grade English language arts students wrote persuasive essays using a specific writing prompt to demonstrate learning outcomes with the implementation of technology to enhance writing.

A review of the aspects of writing, including its purpose, the process, and its importance in education, was addressed. Additionally, writing interventions were discussed as well as technological advances, specifically using Chromebooks to support learning. This research is included to present additional information to support how the planning stage is a critical element of the writing process and how technology enhances the writing process.

Researchers have noted that although there are thousands of studies on effective methods for teaching reading and mathematics, there are relatively few rigorous studies on writing instruction (The Hechinger Report, 2014). According to the most recent National Assessment of Educational Progress, three quarters of both eighth and twelfth graders lack proficiency in writing and 40% of those who took the ACT writing exam in

69

the high school class of 2016 lacked the reading and writing skills necessary to complete successfully a college-level English composition class (Goldstein, 2017).

In keeping with the demands of the 21st-century classroom, teachers are expected to integrate new technology in place of traditional lessons and pedagogical techniques. Because most kids today are already confident with the use of technology, connected classrooms can also encourage students to think and solve real-world problems. Students who are struggling with writing could use a vast number of tools that can help them improve their writing. Graphic organizers are one strategy used to support students in planning writing.

Research Questions

The following two questions guided the study to validate the need to implement a prewriting strategy paralleled with facilitative teaching methods, student engagement, motivation, and academic achievement. Subsequently, the two questions were the guiding force in an effort that challenged third-grade students to write at or above their potential, and academic expectations required them by the state department of education guidelines. Positive outcomes should lend beneficial contributions to future teaching strategies in writing practices. The research questions were

- Research Question 1: How does the implementation of a prewriting strategy, a technology-based graphic organizer (TBGO), impact student engagement in an English language arts classroom?
- Research Question 2: What are the students' perceptions of utilizing the TBGO on Chromebooks as a writing tool, collected through semi-structured interviews?

70

Research Design

To address the research questions for this study, an observable case study methodology was used where I was a full participant. As the classroom teacher, I was a member of the classroom community as well as the researcher. This method was employed to develop an in-depth analysis of a typical classroom of third-grade students learning to write through 1:1 Chromebook instruction. In observational case studies, a group is studied in-depth for a defined period, usually relying on a variety of data sources, including observations, interviews, and a review of existing documents (Mertler, 2017, p. 94).

The collection of qualitative data included student self-reflective journals, teacher-researcher journal, observational rubrics, field notes, interviews, and student artifacts. This data collection allowed me to acquire a thorough description of the engagement and perceptions of third-grade students using Chromebooks during the prewriting stage of persuasive essay writing.

Rationale for Selected Methodology

To explore the effects of a TBGO and 1:1 Chromebooks implementation on the persuasive writing of third-grade students, an action research design was employed. Efron and Ravid (2013) asserted, "In action research, teachers and other personnel take on the role of researchers and study their own practice within their classrooms and schools" (p. 4). Further, according to Merriam and Tisdell (2016), action research's purpose is to "either solve a practical problem or at least to find a way to further enhance what is already positive in a practice situation; it is always focused on the improvement of practice" (p. 50).

Teacher research that emphasizes classroom inquiry as a process of reflection and theory will lead to more informed action (Klehr, 2012, p. 125). The teacher-researcher sought to use this research to enrich and expand her teaching practice while collaborating with other educators to investigate instructional strategies to support the growth and development of all students. Additionally, the goal of practitioners of action research is to improve their practice and foster their professional growth by understanding their students, solving problems, or developing new skills (Efron & Ravid, 2013, p. 4). Mertler (2017) offered benefits for teachers conducting action research including, "Action research deals with your problems, affords a timely approach, provides opportunities to better understand and improve educational practice, promote stronger relationships among colleagues, and provide educators with alternative ways of approaching problems" (p. 19).

A constructivist understanding of teacher knowledge being fluid allowing for modifications and improvement through exchanges with experiences, people, and philosophies to develop concepts for curriculum and instructional practice supports the rationale for this qualitative action research. Constructivist learning theory incorporates student-centered teaching methods and techniques which contrast with traditional education, whereby knowledge is passively transmitted by teachers to students (McLeod, 2019). Vygotsky (1978) believed that the environment in which children grow up would influence how and what they think. Further, Dewey (1933) asserted, "The interaction of knowledge and skills with experience is the key to learning." A constructivist learning environment incorporates a shared knowledge between teacher and student, learning in

72

realistic contexts, social experiences embedded in learning, and learning through active engagement with the world.

Qualitative research is interpretative research; the inquirer is typically involved in a sustained and intensive experience with participants (Creswell & Creswell, 2018, p. 183). This type of research seeks an in-depth understanding of social phenomena within the natural setting and focuses on the "why" rather than the "what" of the social phenomena. Further, qualitative research is used to uncover trends in thought and opinions by digging deeper into the problem at hand. Merriam and Tisdell (2016) asserted, "The design of a qualitative study is emergent and flexible, responsive to changing conditions of the study in progress" (p. 18).

The goal of this action research study is to assist students when brainstorming ideas for a persuasive essay to examine the effect of the different strategies on student achievement, motivation, and engagement. The research will support the use of a TBGO incorporating a mind-mapping program as an advanced planning tool when using the Chromebook for writing. With the prevalence of limited writing growth of third-grade students at the research site, this study should provide evidence to understand what modifications need to result.

Research Design Validity

Validity is one of the strengths of qualitative research. It is based on determining whether the findings are accurate from the standpoint of the researcher, the participant, or the readers of an account (Creswell & Miller, 2000, p. 128). To enhance the accuracy of the findings, the teacher-researcher used multiple validity methods, including

triangulation, providing a rich, thick description to convey findings, clarifying researcher bias, and presenting discrepant information.

Triangulation was utilized to allow the teacher-researcher to examine evidence from the data collection and establish coherent justification for themes. Herr and Anderson (2015) attributed triangulation as "using a variety of methods so that the teacher-researcher is not limited to only one kind of data source" (p. 68). By using multiple methods to collect data, the teacher-researcher depicted different dimensions of the same phenomenon.

The teacher-researcher wanted to add the validity of the findings by providing a rich, thick description to convey the findings of the qualitative action research study. Thick description contributes to credibility through extensive accounts, portrayals, and depictions of interactions and communicative processes as they occur in the field (Tracy & Hinrichs, 2017). Further, the teacher-researcher provided enough detail and demonstrated transparency throughout the action research study to promote the researcher's awareness and understanding of inward motivations, biases, and thought processes.

The teacher-researcher was invested in this action research and motivated by the process of acting to improve her teaching of writing while growing professionally. She aimed to foster a commitment to solving problems associated with the development of students' writing skills.

Efron and Ravid (2013) asserted, "In action research, teachers and other personnel take on the role of researchers and study their own practice within their classrooms and schools" (p. 4). Thus, the teacher-researcher was committed to carrying out the

investigation systematically, reflectively, and critically and use strategies appropriate for the action research.

Context and Setting of Study

This qualitative action research study was conducted is an academic setting of an urban elementary school. The school had an approximate enrollment of about 492 students at the time this study was conducted. The school district was in the southern Atlanta metro area and was considered a highly rated school district by placing in the top six percent in the nation (Niche, 2019). The school accommodated 21 English language arts classes, five of which were third grade. These five classes were identified and characterized as having low, medium, and high performing students who were identified as such by their former second-grade teachers.

Role of the Researcher

The researcher's role in this qualitative action research study was that of teacher-researcher. The researcher was a third-grade teacher at the research site. The teacher made observations and maintained field notes, both descriptive and reflective, throughout the study and analyzed all results. She also designed, scheduled, and conducted all semi-structured student interviews and summative structured student Chromebook surveys. Finally, the teacher-researcher was responsible for collecting all student artifacts and conducting a comparative analysis to determine student engagement and motivation in writing.

The role of the teacher-researcher was explained to the student participants. It was established that all information collected was for the action research study, all participants would remain anonymous, and data collection would remain confidential.

Positionality

Action research is viewed as a practical yet systematic research method that enables teachers to investigate their own teaching and their students' learning (Nolen & Putten, 2007, p. 401). Further, Mills (2018) defined action research as "any systematic inquiry conducted by teachers researchers, principals, school counselors, or other stakeholders in the teaching/learning environment to gather information about how their particular schools operate, how they teach, and how well their students learn" (p. 10). McNiff and Whitehead (2012) stated, "The findings that teachers generate from studying their practice can contribute to a knowledge base that is created by teachers for teachers, or, in the wider sense, by practitioners for practitioners in all workplaces" (p. 75). By conducting this action research, I hoped to gain new knowledge to improve my teaching of writing.

My positionality was that of a teacher-researcher to conduct research using persuasive writing to be collected and assessed using technology (Chromebooks). I incorporated mind-mapping techniques to test the transfer effects of the planning strategy versus mind-mapping using technology. After the data of the action research was collected, analyzed, and interpreted, I discussed with students, teachers, and administrators the results of the action research during the reflection process. This reflection provided a basis for a critical inquiry to evaluate the overall learning experience for students and receive relevant feedback from teachers and administrators about the action research. This examination of the experience and collection of feedback served as a basis for decision-making and as a source of planning and action.

Furthermore, I hoped the results of this action research study would encourage other educators to implement this strategy in their classrooms.

Conversely, if the results of this action research had not shown an increase in student performance in writing, I would have collaborated with teachers and administrators to reevaluate this action research and planned the next steps. Efron and Ravid (2013) offered, "As educators, teachers, administrators, and school support personnel, we all want to improve how we work with our students and advance the way education is practiced in our classrooms and schools" (p. 39). The goal of this action research was to expand educational practices in writing and to integrate technology to enhance student engagement.

Ethical Considerations

It was the responsibility of the researcher to maintain ethical research practices throughout this qualitative action research study. When individuals are involved in research, ethical awareness is vital. Ethical considerations involve three aspects: (a) negotiating and securing access, (b) protecting participants of the study, and (c) assuring good faith (McNiff & Whitehead, 2011, p. 95).

To negotiate and secure access and to employ strict procedural guidelines, the teacher-researcher followed the specific criteria of the school district to obtain approval to conduct the research and provided a proposal of the dissertation topic, interview and survey questions. After approval from the district, the teacher-researcher submitted all approved documents to the Institutional Review Board of the University of South Carolina for university approval. The school site was the location for all data collection,

which took place during the regular school day. The administration and site personnel were supportive and accepting of the action research study.

Approval was given by the research committee and the site's administration. Further, since the project was designed by the teacher-researcher to enhance personal classroom effectiveness, but not designed to develop or contribute to generalizable knowledge, the Institutional Review Board of the University of South Carolina instructed the teacher-researcher to weave the activities of the study into the curriculum. Therefore, written, signed consent, or assent was neither required nor recommended.

Another ethical consideration was to protect participants of the study. Mills (2018) asserted, "Freedom from harm focuses on not exposing students to risks and involves issues of confidentiality (to protect students from embarrassment or ridicule) and issues related to personal privacy" (p. 42). To maintain confidentially and safeguard participants' rights, all data, identities, and information were accessible only to the teacher-researcher. Additionally, participants were given the option to withdraw from the study at any time without consequences. All data regarding this study was kept in a locked storage cabinet accessible only to the teacher-researcher, and transcribed notes were entered into a password-protected laptop.

The teacher-researcher assured good faith by maintaining integrity throughout the research study. In this qualitative action research, the teacher-researcher practiced ethical research principles by ensuring to do no harm to participants, gaining informed consent from parents/guardians, obtaining assent to be a research participant from all students involved in the study, and reporting data as accurately as possible. The potential value of

the findings of research should be worth the time, effort, and energy expended on the part of both the researcher and the participants (Mertler, 2017, p. 115).

Participant Selection

Convenience Sampling

The sample for this action research study consisted of eight third-grade English language arts students at Brookville Elementary. A convenience sampling method was utilized where participants were selected from among the nearest and most accessible individuals (Efron & Ravid, 2013, p. 62). Four participants were girls and four were boys. Participants were between the ages of eight and nine years old. One student was new to the school. The school had a high level of parent involvement and support in the school community. The following participant descriptions include my classroom observations of students. To protect participants' identities, fictitious names are used throughout the study.

Participant One: Benjamin

Benjamin was an eight-year-old boy in the third grade. He came from a middle-class family. Benjamin was an outgoing student who preferred to work with others. He preferred informal seating and more mobility while working. Benjamin is performing below grade-level expectations in math. He received math support services for 30 minutes per day in the Early Intervention Program (EIP). Benjamin was a visual and kinesthetic learner and processed information best when understanding the overall concepts before details. He learned best with authority and teacher feedback.

Participant Two: George

George was a nine-year-old boy in the third grade. He came from an upper-middle-class family. George was a quiet student who worked well independently or with his peers. George had a strong preference for an informal seating arrangement in one place. George displayed a strong preference for being multi-task persistent and having assignments divided into smaller parts. George's auditory and tactual preferences depended on his interest in what he was learning.

Participant Three: Kalen

Kalen was a nine-year-old girl in the third grade. She came from a middle-class family. Kalen was an active learner who worked well independently or with her peers. Kalen required occasional prompts to stay on task and learned best with authority and teacher feedback. She had a strong preference for less structure, more variety, and more choices about her work. Kalen had a strong preference for being less conforming, preferred self-motivation, and was motivated to do well academically. She had strong visual and kinesthetic preferences.

Participant Four: Kerrie

Kerrie was an eight-year-old girl in the third grade. She came from a middle-class family. Kerrie worked well both independently and cooperatively with her peers. She preferred auditory learning and was a reflective thinker. Kerrie's ability to learn by listening, seeing, moving, and touching depended on what she was learning. Her motivation was also dependent on what she was learning. Kerrie had an analytical approach to processing information and favored presentation of information in an orderly, logical manner.

Participant Five: Lisa

Lisa was an eight-year-old girl in the third grade. She came from an upper middle-class family. Lisa showed strong preferences for a quiet atmosphere with formal seating and less mobility. She also showed strong preferences for single-task persistence and assignments with more structured guidelines, although she showed a strong preference for variety and working in different ways to get tasks done. Lisa worked best alone with encouraging feedback from the teacher. She processed information best when understanding the overall concepts before details.

Participant Six: Mary

Mary was an eight-year-old girl in the third grade. She came from an upper-middle-class family. Mary preferred learning with less structured and more variety. She was self-motivated about her learning and doing well academically. Mary had strong visual, kinesthetic, and auditory preferences for learning. Mary understood concepts and skills first, then processed information globally.

Participant Seven: Michael

Michael was a nine-year-old boy in the third grade. He came from an upper-middle-class family. Michael showed strong preferences for being less conforming, motivated by others, multi-task persistent, more structure, more mobility, learning with authority, and learns best by seeing. He showed a preference for being more impulsive than reflective in answering questions. He also preferred to process information globally and understand new information conceptually before being given all the details.

Participant Eight: Ralph

Ralph was a nine-year-old boy in the third grade. He came from an upper-middle class family. Ralph had a strong preference for quiet and low light while working. He worked best alone, with informal seating in one place. Ralph preferred having assignments divided into smaller parts and taking breaks in between. He preferred working in a variety of ways rather than always working in the same manner. Ralph showed a preference for being self-motivated and had a strong preference for learning by moving. He was a visual learner, and his auditory and tactual preferences depended on his interest in what he was learning.

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Data Collection, Tools, and Instruments

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There were several types of data collection utilized in this action research study to triangulate data. Instrumentation allowed for data collection to be taken from multiple perspectives. The methods used for data collection allowed the teacher-researcher to critically view the impact on student engagement of a technology-based graphic organizer (TBGO) as a prewriting strategy and interpret students' perceptions about using technology during writing instruction.

Teacher Observations of Student Engagement

Action researchers must avoid collecting merely anecdotal data—that is, just the opinions of people as to how the problem might be addressed (Fraenkel et al., 2015, p. 592). Observations, field notes, interviews, and surveys are possible methodologies used to investigate a phenomenon in action research. Observation is a major means of collecting data in qualitative research (Merriam & Tisdell, 2016, p. 160). When researchers seek to gain an understanding of a phenomenon, situation, and/or setting and

82

the behavior of participants in the setting, observations are often utilized. Denzin and Lincoln (2013) recognized that "qualitative researchers study things in their natural settings, attempting to make sense of, or interpret, phenomena in terms of the meanings people bring to them" (p. 3). Further, observations are an essential part of the understanding of naturalistic settings and participants' involvement in the settings.

Classroom observations were a primary method for collecting data by the teacher-researcher. For this action research, daily observations of student engagement were recorded during this study with a teacher-researcher designed rating rubric (Appendix A). The rubric was created to rate five types of student engagement while using a TBGO. The teacher-researcher scored student engagement using the five levels of student engagement continuum ranging from Engagement to Rebellion and include Engagement, Strategic Compliance, Ritual Compliance, Retreatism, and Rebellion. For each type of engagement, the teacher-researcher rated the frequency of each of the five types of engagement. The frequency range included Almost Always, Often, Rarely, and Never. The teacher rating rubric was designated based on a five-level engagement framework developed by Schlecty (2011), establishing the characteristics of student engagement. An audio recording device was employed to support the teacher-researcher memories during the observations. Additionally, the teacher-researcher collected field notes during each classroom observation.

Teacher-Researcher Journal (Field Notes)

Field notes are written observations of what you see taking place in your classroom (Johnson, 2008). The teacher-researcher journal (Appendix C) was used to record classroom observations using two types of field notes: descriptive and reflective

83

notes. By using descriptive notes, the teacher-researcher documented a rich description of what is seen and heard in the learning environment. Whereas, reflective notes allowed the teacher-researcher to record the thoughts and understandings the observations generate. The format used when recording field notes consisted of two columns per page where the left column was used to record actual observations (descriptive) and the right column for noting preliminary interpretations (reflective) of what has been observed (Mertler, 2017, p. 132).

During each observation, jotted field notes were taken in a notebook by the teacher-researcher and entered into a secure database using a laptop within 24 hours while the information was still fresh. The jotted field notes were converted into formalized field notes by the teacher-researcher to provide more detailed depictions of activities and events observed to create a seamless narrative. Many researchers insist that field notes be written contemporaneously as perspectives change over time and because of the importance of preserving experience close to the moment of occurrence (Emerson et al., 2011, p. 17).

Students Self-Reflective Digital Journals

Student participants completed self-reflective journals digitally each day of the study, responding to prompts about the impact of using a TBGO during the prewriting phase of writing a persuasive essay. The self-reflective digital journals (Appendix D) were completed using Google Docs on their Chromebooks and shared with the teacher-researcher. Self-reflective digital journals were selected as a data collection source to help students enable a more in-depth analysis of the experience through assessment and expression of using technology during the prewriting phase of writing a persuasive essay.

This insight into participants' thinking and the observation of the classroom activities throughout the study allowed the teacher-researcher to analyze patterns in students' engagement and perceptions while using technology in writing.

Semi-Structured Interviews of Participants

Efron and Ravid (2013) identified the interview as a significant data collection strategy in action research that "provides an understanding of the participants' experiences from their own perspectives because it allows them to voice their ideas, opinions, values, and knowledge on issues related to the investigation" (p. 98). Eight participants were interviewed to see how they viewed themselves as writers and as to the effects of the implementation of technology on student writing and the students' perceptions about writing. Semi-structured interviews of the participants involved in this action research study were used as a form of data collection to provide the teacher-researcher with a deeper insight into the students' perceptions about writing, the implementation of a TBGO, and the use of Chromebooks to support writing.

In the semi-structured student interviews, the teacher-researcher asked participants questions about their attitudes about writing, and how they felt about using technology in writing and school (Appendix E). To avoid potential bias, the teacher-researcher took appropriate measures by framing questions in an open-ended and concise format to guide the participants to provide truthful answers. Further, the teacher-researcher maintained neutrality throughout each interview to avoid influencing the participants' responses. There were eight participants interviewed by the teacher-researcher, and all interviews were audiotaped. Additionally, the teacher-researcher wrote descriptive notes during each interview and reflective notes following each interview to

ensure precise accounts were documented to increase validity. Once all notes were compiled, the interviews were transcribed and later analyzed for results. The audiotapes provided documentation for the reliability of the collected data.

Summative Structured Student Chromebook Survey

Students were given a summative structured student Chromebook survey (Appendix B) developed by the teacher-researcher following the implementation of the TBGO during the prewriting phase of the persuasive essay. The teacher-researcher designed the survey to gather data applicable to the context of the study based on the goals of the school district's 2019-2020 Technology Plan. Further, the student Chromebook survey was designed to gain students' perspectives of their learning while using Chromebooks. Six items were aimed at exploring students' engagement in writing, and nine items were aimed at exploring students' perceptions of how Chromebooks relate to different learning modalities. One item on the survey focused on determining if Chromebooks distracted students from writing.

Student Artifacts

In addition to other methods of data collection, student artifacts were gathered to provide insight into how the implementation of a TBGO would affect student writing. These student artifacts were collected and used to help determine student motivation during the writing lessons. A third-grade persuasive writing rubric (Appendix J) was utilized to assess the completed persuasive essays. Moreover, if students used the TBGO (Appendix K) to help plan and organize their writing during the prewriting phase of the lesson, it indicated that they were engaged in the lesson and spent more time writing than being off-task. Student mind maps were assessed using a mind mapping rubric (Appendix

I) to help determine student motivation and engagement. By combining this data with the systematic observations, a more accurate evaluation of student engagement was obtained. Thus, student artifacts offered another piece to assess the motivation of the implementation of technology in writing.

Procedure

The intervention implemented involved a combination of low-, medium-, and high-performing third-grade English language arts students who actively participated in an authentic writing activity where they wrote persuasive essays using a specific writing prompt to demonstrate an understanding of the importance of the prewriting, or brainstorming, phase of the writing process. The conditions under which persuasive essays were written included planning with a TBGO (mind mapping program). During the writing process, the TBGO was utilized during the prewriting phase to help students visualize their ideas and support, making connections between ideas formulated given a specific prompt. In addition, qualitative data about students' perceptions about the technology were explored through semi-structured interviews. Mertler (2017) offered, "It is typically more desirable for the researcher to have some flexibility and to be able to ask clarifying questions to pursue information not initially planned for, and to seek different information from different people" (p. 134).

Additionally, the student participants were given a review of the steps of the writing process—prewriting, first draft, revising, editing, and final draft—prior to the implementation of the intervention. Moreover, emphasis was provided about the importance of the prewriting or brainstorming, step of the writing process to establish a clear understanding of this component of writing. The study further observed for

87

appropriateness of adhering to the guidelines of the instructions. Students needed to follow the specific directions in preparation for the intervention. This validated the verbal instruction given to carry out the prewriting phase of the writing process appropriately.

The study was conducted for seven instructional days and included specific instructions for each day of the writing workshop. On day one, the teacher-researcher reviewed the writing process steps—prewriting, first draft, revising, editing, and publishing. Additionally, on the first day of the writing workshop, participants were introduced to the persuasive writing topic—what is the best vacation spot? The teacher-researcher asked the participants to think and select the best vacation spot from the following three choices: the beach, the mountains, or a big city. On day two, the teacher-researcher introduced the TBGO and demonstrated how to access and navigate the TBGO via Google Docs. The third and fourth days of the writing workshop consisted of the participants brainstorming for their persuasive essay using the TBGO by adding images and words to provide three reasons to support their opinion. Students typed their first draft of their persuasive essay on days five and six using Google Docs and using their TBGO as reference. Additionally, students revised and edited their first drafts on days five and six of the writing workshop. On the last day, students published their persuasive essays via Google Docs.

The qualitative approach provided data collected for the brainstorming phase of the persuasive essay. This design was chosen for two reasons: (1) it is emergent and flexible, and (2) it may enhance generalizability. The participants were provided an age-appropriate writing prompt and received instruction in planning with the mind mapping program on their Chromebooks. Participants were observed closely as they worked, and

data from observations regarding student engagement was collected throughout the study. Work produced in the classroom was examined carefully so that the teacher-researcher could understand the progress of the participants. Participants were not instructed to participate in anything other than designed classroom lessons.

Data Analysis

This action research was designed to examine the impact of implementing a prewriting strategy to assist students when brainstorming ideas for a persuasive essay. Qualitative research was used as the foundation of this study. To triangulate data, several types of data were collected. One set of data was collected through teacher observed data from teacher-researcher observation rubric of the five types of student engagement and scored during this qualitative action research study. The five types of student engagement were Engagement, Strategic Compliance, Ritual Compliance, Retreatism, and Rebellion. Based on direct observation and utilizing the rubric, the frequency of each participant engaged in these five different kinds of interactions using Chromebooks was recorded. During the seven instructional days during which the study took place, each participant was observed twice, once at the beginning of the study and once at the end. During observations, jotted field notes were gathered on the eight participants and documented by the teacher-researcher journal and entered in a secure database using a laptop within 24 hours. The jotted field notes were converted into formalized field notes to provide more detailed explanations of the observed activities and events.

Student participants completed self-reflective digital journals (Appendix D) each day of the study using Google Docs on their Chromebooks and shared with the teacher-researcher. Digital journal entries were participants' responses to prompts designed to

identify patterns in students' engagement and perceptions while using technology in writing. The self-reflective digital journals were analyzed for patterns, themes, categories, and connections, and students' work were collected and maintained digitally.

In qualitative research, interviewing is often the major source of the qualitative data needed for understanding the phenomenon under study (Merriam & Tisdell, 2016, p. 136). To gain insight into participants' views about writing and using technology in writing, semi-structured interviews were employed where the teacher-researcher asked participants open-ended and specific questions. The teacher-researcher took descriptive notes during each participant interview and reflective notes following each interview. These notes were transcribed, and audiotapes were reviewed to maintain accurate accounts and increase the validity of the information documented. The teacher-researcher employed verbatim accounts, rigorous examination of atypical or contradictory information, and triangulation during analysis. Since the researcher is the primary instrument for data collection, data have been filtered through his or her particular theoretical position and biases (Merriam & Tisdell, 2016, p. 264). To reduce any inherent biases and to enhance validity, triangulation was used to substantiate the data.

A summative structured student Chromebook survey was given to the participants following the implementation of the TBGO during the prewriting phase of the persuasive essay. Participants completed a 15-question survey to assist the teacher-researcher in better understanding the students' perceptions about using technology (Chromebooks) in writing. Ferguson (2012) stated, "Well-constructed classroom-level student surveys are a low burden and high-potential mechanism for incorporating students' voices into our

efforts to improve teaching and learning" (p. 28). The data from the surveys were analyzed for similar responses and coded to find similarities as well as differences.

The vast amount of data collected in this qualitative action research required the teacher-researcher to develop an organizational method to identify patterns, themes, and categories from the data. Properly employing the qualitative data gleaned from interviews, field observations, and document analysis can lead the researcher to gain a deeper understanding of the problem than merely analyzing data on a larger scale (Malakolunthu, 2007, p. 181). NVivo, a Qualitative Data Analysis (QDA) computer software, was used to help manage data and ideas, querying data, modeling visually, and reporting. Further, this software reduced manual tasks and gave the teacher-researcher more time to discover tendencies and recognize themes and derive conclusions.

Conclusion

This qualitative action research was carried out to determine the effects of a TBGO (mind-mapping) and 1:1 Chromebooks on the persuasive writing of third graders. Action research's purpose is to either solve a practical problem or at least to find a way to further enhance what is already positive in a practice situation; it is always focused on the improvement of practice (Merriam & Tisdell, 2016, p. 50). In this action research, the teacher-researcher elected to focus on one aspect of the writing process, the prewriting stage, to look through a critical lens of this step in isolation. Following the implementation of the TBGO, the data were analyzed as a result of the implementation of the intervention. Herr and Anderson (2015) emphasized that action research is about engaging in action that "organizational or community members have taken, are taking, or wish to take" (p. 4) to change some aspects of their situation. Further, the teacher-

researcher employed action to discover educational strategies to enhance engagement and motivation of students when writing persuasive pieces.

CHAPTER 4

FINDINGS

The purpose of this qualitative action research study was to examine the impact
on student achievement, engagement, and motivation when a prewriting strategy, a
technology-based graphic organizer (TBGO) using 1:1 Chromebooks, was implemented
to assist third-grade English language arts students when brainstorming ideas for a
persuasive essay. The statement of problem pertains to providing students with 21st-
century skills to prepare them for the future with an identified need to improve writing
skills. The anticipated outcomes gained from this research will provide insights into the
significance of integrating technology to enhance writing, considering students'
perceptions of the use of technology to write persuasive essays and verifying the
generalizability of the intervention to paper.

Chapter Four presents findings obtained from student self-reflective digital
journals, teacher-researcher journal, performance rubrics, field notes, participant
interviews, student Chromebook surveys, and student artifacts utilizing the research
questions, "How does the implementation of a prewriting strategy, a technology-based
graphic organizer (TBGO) as a prewriting strategy, impact student engagement in an
English language arts classroom?" and "What are the students' perceptions of utilizing
the TBGO on Chromebooks as a writing tool?"

93

Intervention/Strategy

In today's 21st-century classrooms, teachers must find engaging ways to teach the English language arts curriculum, including writing, to the current generation of students who have grown up with technology as a constant in their lives. These students may need more than traditional lessons and pedagogical techniques to encourage and inspire them to learn. Further, students need writing skills to be successful in school and life; however, three out of four students are not meeting grade-level proficiency in writing (NAEP, 2011).

This study explored the usefulness of incorporating a mind-mapping program, using Chromebooks to assist students when brainstorming ideas for a persuasive essay and recognized students' perceptions of the use of technology to write persuasive essays using a specific writing prompt. This intervention was selected for this study to emphasize one strategy that educators could use to increase the engagement, motivation, and achievement when teaching writing in their 21st-century classrooms.

Data Collection Methods

The research questions were answered by examining multiple sources of data. The two research questions guided the study to validate the need to implement a prewriting strategy using Chromebooks to enhance student engagement, motivation, and academic achievement in writing.

Research Question 1

How Does the Implementation of a Prewriting Strategy, a Technology-Based Graphic Organizer (TBGO), Impact Student Engagement in an English Language Arts Classroom?

Research question one aimed to determine how the implementation of the prewriting strategy, a technology-based graphic organizer (TBGO), impacted student engagement in an English language arts classroom. The teacher-researcher collected data through observations, self-reflective digital journals, student artifacts, and Chromebook surveys to obtain data from multiple perspectives.

The participant's observations were recorded by the teacher-researcher using an evaluation rubric identifying five types of engagement. The teacher-researcher made comments about student engagement and behaviors on the rubric as well as recorded via field notes. The teacher-researcher offered preliminary or reflexive interpretations following the student observations. Further, the teacher-researcher maintained careful attention to objectivity in documenting observations throughout the study.

Self-reflective digital journals were completed by participants each day of the research study. Participants responded to seven different questions to offer their perceptions about the use of the TBGO to help them prewrite a persuasive essay. The self-reflective digital journals were completed by the participants using Google Slides using their Chromebook. Self-reflective digital journals were utilized for data collection because the information gained from them provided the teacher-researcher understanding into the thinking of the students and the activities associated with the action research

study. Further, analysis of the self-reflective digital journals presented themes in student perceptions about using technology in the writing curriculum.

Findings from the student-digital journals aligned with data collected from the Chromebook surveys and student interviews. Participants were asked to respond to the following journal prompt: "How did mind mapping help you visualize or picture your three reasons or evidence to support your opinion?" All eight participants gave positive feedback including the following responses:

> "My mind map helped me picture ideas and it helped me know what I was going to write."

> "My mind map helped me think about all the reasons I chose my favorite vacation spot."

> "Mind mapping helped me picture my three reasons by helping me remember some details about my favorite place."

> "The mind map helped me picture things in my mind that I wanted to write about."

> "The mind map helped me visualize my three reasons because we added pictures."

> "My mind map helped me picture my three reasons by helping me know what to write."

> "My mind map helped me by getting my ideas in my brain so I could write them down."

> "Mind maps are fun because I put pictures to talk about my favorite place to go on vacation."

Student artifacts, including student digital journals, mind maps, and persuasive essays, were collected to allow the teacher-researcher to determine themes. The student artifacts were a valuable form of data collection because they depicted a final representation of the writing project. Further, the artifacts created by the participants

demonstrated students' competencies when using a TBGO during the prewriting phase while writing a persuasive essay.

Once the writing project was completed, the participants completed a summative structured Chromebook survey. This survey was created by the teacher-researcher to gain students' perspectives of their learning while using Chromebooks and exploring students' engagement in writing with and without using technology. Six items were aimed at exploring students' engagement in writing, nine items on exploring students' perceptions of how Chromebooks relate to different learning modalities, and one item on the survey sought to determine if Chromebooks distracted students when writing.

Research Question 2

What Are the Students' Perceptions of Utilizing the TBGO on Chromebooks as a Writing Tool, Collected Through Semi-Structured Interviews?

Research question two focused on determining the students' perceptions of utilizing the TBGO as a writing tool using Chromebooks. Data was collected through semi-structured student interviews and participants expressed their ideas and views about using a TBGO as a prewriting tool when writing a persuasive essay, and several common themes emerged.

The teacher-researcher conducted individual student interviews following the final day of the action research study. Participants were asked ten interview questions to provide the teacher-researcher with a more in-depth insight into the students' perceptions about writing, the implementation of a TBGO, and the use of Chromebooks to support writing. Each interview was recorded, transcribed, and analyzed for specific themes. Key words and phrases were identified and categorized using summary charts. Feedback from

the student interviews was consistent with the Chromebook surveys and student digital journals when participants were asked to reflect on whether technology impacted their writing by inquiring. The teacher-researcher asked participants, "Did you like using the technology-based graphic organizer to plan and organize your writing?" All eight students responded with positive feedback. Participant responses included the following:

"I liked using mind maps to plan my writing."

"I liked to adding pictures when planning my writing."

"Using the Chromebook made writing easier."

"Once I learned how do the mind map, it was easy."

"I like to use graphic organizer to plan my writing."

"Mind mapping is my favorite way to organize my writing."

"I like to jot down my ideas before I write."

"My Chromebook helps me write better."

Part One of this chapter presents descriptions of each participant via teacher-researcher observations, self-reflective digital journals, student interviews, Chromebook survey, and student artifacts. In Part Two, the data are analyzed, and a discussion is presented.

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Part One: Participant Descriptions

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Participant One: Benjamin

Ben was an eight-year-old boy who was an active student. He learned best with teacher feedback and prompts.

Observations

The student was observed on two days, January 15 and January 22, 2020. The teacher-researcher utilized an evaluation rubric identifying the five types of engagement and observed the following:

- The student often manipulated the mind-mapping program features and utilized the functions of the programming to test a personal understanding of the programming content.

- The student often manipulated the Chromebook features to effectively navigate the mind-mapping program to allow the student to reflect on personal values or experience.

- The student did maintain involved interactions with the mind-mapping program; however, the student rarely adjusted the programming features to sustain interesting or challenging interactions and creatively used the program for designated purpose.

- The student often pursued the goals communicated with the mind-mapping program. The student did not display full mastery of the mind-mapping features but responded to operational, navigational, or content organization.

The teacher-researcher's preliminary or reflective interpretations offered that the student had some understanding of mind-mapping and extrinsic outcomes (i.e., getting good grades) encouraged this student to demonstrate an apparent effort and some creativity.

Self-Reflective Digital Journal

The student expressed that prewriting or brainstorming helped him organize his ideas. He stated that mind-mapping was difficult because it was hard to find pictures for

his ideas. Further, he offered that mind-mapping helped him picture what he wanted to write for his essay.

Interview

The student provided positive feedback about using his Chromebook to play games and expressed that he liked to publish via typing instead of writing on paper. He stated that the TBGO helped him organize his ideas for his persuasive essay.

Chromebook Survey

The student strongly agreed that the Chromebook is a useful learning tool, allowed mobility when learning, motivates him to learn, helped him organize his thoughts using mind-mapping to be more creative in his writing. Further, the student agreed that using a Chromebook helps him learn, made writing easier, helped him concentrate on his writing, and helped him stay focused while working. The student added that he was not sure if he improved his writing while using the Chromebook or that it helped his teacher teach him better.

Student Artifacts

The student presented three reasons to support his opinion and included three images that supported his ideas on his mind-map. Using his mind-map, the student planned for his persuasive and published a four-paragraph essay.

Participant Two: George

George was a nine-year-old boy who was new to the school. He was a quiet student who worked well independently.

Observations

The student was observed on two days, January 15 and January 23, 2020. The teacher-researcher utilized an evaluation rubric identifying the five types of engagement and observed the following:

- The student almost always manipulated the mind-mapping program features and the functions of the programming to test a personal understanding of the programming content.

- The student almost always manipulated the Chromebook features to effectively navigate the mind-mapping program to allow the student to reflect on personal values or experience.

- The student always maintained involved interactions with the mind-mapping program and adjusted the programming features to sustain interesting or challenging interactions and creatively used the program for the designated purpose.

- The student almost always pursued the goals communicated with the mind-mapping program. The student did display full mastery of the mind-mapping features and responded to operational, navigational, or content organization.

The teacher-researcher's preliminary or reflective interpretations offered that the student understood mind-mapping and its purpose as a prewriting strategy for the persuasive essay. Further, the student demonstrated persistence, sustained inquiry, and self-direction for the transfer of understanding.

Self-Reflective Digital Journal

The student stated that prewriting using mind-mapping allowed him to organize his ideas easily. He offered that mind-mapping helped him visualize what he would write about in his persuasive essay.

Interview

The student expressed that he liked using his Chromebook to play games and to complete writing. He stated that he likes to write about places, fun things, and animals and that writing is difficult at times, but webs or mind-maps help him plan what he will write.

Chromebook Survey

The student strongly agreed that the Chromebook is a useful learning tool and enjoyed using his Chromebook for class activities (including writing), that technology helped him learn and that using a TBGO via his Chromebook helped him plan his writing. He agreed that the Chromebook motivated and helped him improve his writing, helped his teacher teach him better, that being mobile while using his Chromebook helped him learn by being more focused and that he concentrated better. He stated that the Chromebook did not distract her when she was writing.

Student Artifacts

The student offered three reasons to support his opinion about the writing topic and included pictures related to his ideas. By utilizing his mind-map, the student developed a five-paragraph persuasive essay.

Participant Three: Kalen

Kalen was a nine-year-old girl who was an active learner. She worked well independently or with her peers.

Observations

The student was observed on two days, January 16 and January 24, 2020. The teacher-researcher utilized an evaluation rubric identifying the five types of engagement and observed the following:

- The student almost always manipulated the mind-mapping program features and Functions of the programming to test a personal understanding of the content.

- The student often manipulated the Chromebook features to effectively navigate the mind-mapping program to allow the student to reflect on personal values or experience.

- The student often maintained involved interactions with the mind-mapping program and adjusted the programming features to sustain interesting or challenging interactions and

  creatively used the program for the designated purpose.

- The student often pursued the goals communicated with the mind-mapping program. The student did display full mastery of the mind-mapping features and responded to operational, navigational, or content organization.

The teacher-researcher's preliminary or reflective interpretations offered that the student understood mind-mapping and its purpose as a prewriting strategy for the persuasive essay and a focus on directions and task completion to meet extrinsic standards (i.e., good grades, teacher's approval) for motivation was evident.

Self-Reflective Digital Journal

This student presented the idea that mind-mapping helped her "group her ideas," which made writing her persuasive essay easier. In addition, she stated that mind-mapping helped her picture the ideas she wanted to write about prior to her writing her persuasive essay.

Interview

The student expressed that although writing was not her favorite subject, she liked it somewhat and she prefers using graphic organizers, including technology-based, to organize her ideas when writing. Additionally, the student stated that she likes using her Chromebook to play games and that using the Chromebook makes completing schoolwork easier.

Chromebook Survey

The student strongly agreed that the Chromebook helped her learn, is a useful learning tool, helped her improve her writing when using the TBGO via her Chromebook, motivated her to learn and be more creative in her writing and increased her concentration. Additionally, the student agreed that the Chromebook helped her teacher teach her better, helped her learn when using technology, made writing easier, and allowed her to focus when writing. She stated that the Chromebook did not distract her when she was writing.

Student Artifacts

The student expressed three reasons to support her opinion and incorporated images that represented her ideas on her mind-map. She wrote a five-paragraph persuasive essay using her mind-map as a planning guide.

Participant Four: Kerrie

Kerrie was an eight-year-old girl whose motivation was dependent on what she was learning.

Observations

The student was observed on two days, January 17 and January 29, 2020. The teacher-researcher utilized an evaluation rubric identifying the five types of engagement and observed the following:

- The student almost always manipulated the mind-mapping program features and Functions of the programming to test a personal understanding of the content.

- The student almost always manipulated the Chromebook features to effectively navigate the mind-mapping program to allow the student to reflect on personal values or experience.

- The student almost always maintained involved interactions with the mind-mapping program and adjusted the programming features to sustain interesting or challenging interactions and creatively used the program for the designated purpose.

- The student almost always pursued goals communicated with the mind-mapping program. The student did display full mastery of the mind-mapping features and responded to operational, navigational, or content organization.

The teacher-researcher's preliminary or reflective interpretations offered that the student understood mind-mapping and its purpose as a prewriting strategy for the persuasive essay. Further, the student demonstrated persistence, sustained inquiry, and self-direction for the transfer of understanding.

Self-Reflective Digital Journal

The student expressed that mind-mapping was an easy way to imagine ideas to help organize her writing. She offered that by using mind-mapping, she could simply refer to it when she was writing her persuasive essay.

Interview

The student stated that she liked writing and that using her Chromebook helped her complete her assignments, including writing, more quickly. She said that using the TBGO helped her know what to type and that she uses her Chromebook to finish her assignments and play educational games.

Chromebook Survey

The student strongly agreed that the Chromebook helped her learn, is a useful learning tool, helped her learn when being mobile, made writing easier when using mind-mapping to brainstorm when writing, and helped here concentrate better on her writing. The student agreed that her writing improved and was more creative when she used her Chromebook, helped her teacher teach her better, and enjoyed using her Chromebook for class activities.

Student Artifacts

The student gave three reasons for her opinion on her mind-map and included images to represent her ideas. The student published a five-paragraph persuasive essay using her mind-map as a brainstorming tool.

Participant Five: Lisa

Lisa was an eight-year-old girl who preferred a quiet atmosphere with structured learning guidelines.

Observations

The student was observed on two days, January 16 and January 22, 2020. The teacher-researcher utilized an evaluation rubric identifying the five types of engagement and observed the following:

- The student almost always manipulated the mind-mapping program features and the functions of the programming to test a personal understanding of the programming content.

- The student almost always manipulated the Chromebook features to effectively navigate the mind-mapping program to allow the student to reflect on personal values or experience.

- The student almost always maintained involved interactions with the mind-mapping program and adjusted the programming features to sustain interesting or challenging interactions and creatively used the program for the designated purpose.

- The student almost always pursued the goals communicated with the mind-mapping program. The student did display full mastery of mind-mapping features and responded to operational, navigational, or content organization.

The teacher-researcher's preliminary or reflective interpretations offered that the student understood mind-mapping and its purpose as a prewriting strategy for the persuasive essay. Further, the student demonstrated persistence, sustained inquiry, and self-direction for the transfer of understanding.

Self-Reflective Digital Journal

The student conveyed that mind-maps helped her organize her ideas to establish a plan by sorting everything to help her write her persuasive essay. She added that by adding pictures, it helped her visualize what she wanted to write.

Interview

The student stated that she enjoys writing stories about real people and that using her Chromebook for writing helps her publish her work faster. She also expressed that using a TBGO was easy to use and helped her visualize her ideas before she began to write.

Chromebook Survey

The student strongly agreed that the Chromebook is a useful learning tool, that using the Chromebook helped and motivated her to learn, improved her writing by encouraging her to be more focused and creative, helped her teacher teach her better, encouraged her to learn by using technology, and made writing easier by improving her concentration during writing. She stated that the Chromebook did not distract her when she was writing.

Student Artifacts

The student provided three reasons and pictures to support her opinion on her mind-map. The student wrote a five-paragraph persuasive essay about the writing topic given.

Participant Six: Mary

Mary was an eight-year-old girl who was self-motivated and preferred to learn with less structure and more variety.

Observations

The student was observed on two days, January 17 and January 24, 2020. The teacher-researcher utilized an evaluation rubric identifying the five types of engagement and observed the following:

- The student almost always manipulated the mind-mapping program features and the functions of the programming to test a personal understanding of the programming content.

- The student often manipulated the Chromebook features to effectively navigate the mind-mapping program to allow the student to reflect on personal values or experience.

- The student often maintained involved interactions with the mind-mapping program and adjusted the programming features to sustain interesting or challenging interactions and creatively used the program for the designated purpose.

- The student often pursued the goals communicated with the mind-mapping program. The student did display full mastery of mind-mapping features and responded to operational, navigational, or content organization.

The teacher-researcher's preliminary or reflective interpretations offered that the student understood mind-mapping and its purpose as a prewriting strategy for the persuasive essay and a focus on directions and task completion to meet extrinsic standards (i.e., good grades, teacher's approval) for motivation is evident.

Self-Reflective Digital Journal

The student stated that mind-mapping helped her organize her ideas into three main ideas. In addition, she offered that mind-maps helped her picture what her persuasive essay would include.

Interview

The student expressed that writing is sometimes hard for her, but the TBGO helped her plan her ideas for writing. She stated that she uses her Chromebook to play games, complete her schoolwork, and hoped to be able to use mind-mapping again to help her write.

Chromebook Survey

The student strongly agreed the Chromebook is a useful learning tool, helped her learn in class by using technology, made writing easier, and enjoyed using the Chromebook for class activities. The student agreed that using the Chromebook helped her improve her writing by being more creative and motivated her to learn. Additionally, the student was neutral about whether the Chromebook helped her teacher teach her better, whether the Chromebook helped her concentrate better on her writing, and if being mobile while using her Chromebook helped her learn. She disagreed that the Chromebook helped her stay focused and stated that the Chromebook distracted her when she was writing.

Student Artifacts

The student submitted three reasons to support her opinion and included pictures on her mind-map. The student published four-paragraphs for her persuasive essay.

Participant Seven: Michael

Michael was a nine-year-old boy who was impulsive and learned best visually and kinesthetically.

Observations

The student was observed on two days, January 23 and January 29, 2020. The teacher-researcher utilized an evaluation rubric identifying the five types of engagement and observed the following:

- The student almost always manipulated the mind-mapping program features and the functions of the programming to test a personal understanding of the programming content.

- The student almost always manipulated the Chromebook features to effectively navigate the mind-mapping program to allow the student to reflect on personal values or experience.

- The student often maintained involved interactions with the mind-mapping program and adjusted the programming features to sustain interesting or challenging interactions and creatively used the program for the designated purpose.

- The student often pursued the goals communicated with the mind-mapping program. The student did display full mastery of mind-mapping features and responded to operational, navigational, or content organization.

The teacher-researcher's preliminary or reflective interpretations offered that the student understood mind-mapping and its purpose as a prewriting strategy for the persuasive

essay. Further, the student demonstrated sustained inquiry and some self-direction for the transfer of understanding.

Self-Reflective Digital Journal

The student offered that he thinks prewriting using mind-maps is important because it helps him not get stuck when writing his persuasive essay, and mind-mapping helps him picture ideas in his head.

Interview

The student expressed that he did not like to write, and that mind-mapping helped him plan his writing because he could picture what he planned to write. He stated that he enjoyed using his Chromebook for games and that using his Chromebook made writing easier because he thinks typing is better than writing on paper.

Chromebook Survey

The student strongly agreed that the Chromebook is a useful learning tool and motivated him to learn which made writing easier, using the Chromebook helped him concentrate during writing, helped his teacher teach him better, being mobile helped him work, and he enjoyed using the Chromebook for class activities. The student agreed that using the Chromebook helped him learn in class when using technology, assisted when brainstorming to organize his ideas using mind-mapping, and encouraged him to be more creative in his writing. The student was neutral regarding whether the Chromebook improved his writing or whether using the Chromebook helped him stay focused during his work. He stated that the Chromebook did not distract him when he was writing.

112

Student Artifacts

The student gave three reasons to support his opinion and provided pictures related to his ideas. The student produced a five-paragraph persuasive essay using his mind-map.

Participant Eight: Ralph

Ralph was a nine-year-old boy who preferred to work alone. Ralph was a self-motivated learner.

Observations

The student was observed on two days, January 15 and January 22, 2020. The teacher-researcher utilized an evaluation rubric identifying the five types of engagement and observed the following:

- The student almost always manipulated the mind-mapping program features and the functions of the program to test a personal understanding of the content.

- The student often manipulated the Chromebook features to effectively navigate the mind-mapping program to allow the student to reflect on personal values or experience.

- The student often maintained involved interactions with the mind-mapping program and adjusted the programming features to sustain interesting or challenging interactions and creatively used the program for the designated purpose.

- The student often pursued the goals communicated with the mind-mapping program. The student did display full mastery of the mind-mapping features and responded to operational, navigational, or content organization.

The teacher-researcher's preliminary or reflective interpretations offered that the student understood mind-mapping and its purpose as a prewriting strategy for the persuasive essay and a focus on directions and task completion to meet extrinsic standards (i.e., good grades, teacher's approval) for motivation is evident.

Self-Reflective Digital Journal

The student stated that he thinks prewriting is important because if he skips brainstorming, he will have trouble putting words on his paper because he did not plan before he started writing. Additionally, he expressed that using mind-maps made writing fun.

Interview

The student expressed that writing was not his favorite subject but using mind-mapping helped him plan his writing. He stated that he enjoyed using his Chromebook to complete his schoolwork and play some games. Further, he said that he enjoys using his Chromebook to write because it makes writing easier.

Chromebook Survey

The student strongly agreed that the Chromebook is a useful learning tool, helped him during writing by making writing easier, assisted his teacher in teaching him better, and aided his learning by using technology. The student agreed that the Chromebook helped him learn in class because he was able to move around, organize his thoughts using mind-mapping, motivated him to learn, stay focused while working, and helped him be more creative in his writing. He was neutral regarding whether the Chromebook distracted him when he was writing or whether the Chromebook helped him concentrate better on his writing.

Student Artifacts

The student presented three reasons to support his opinion and images related to his ideas on his mind-map. He published a five-paragraph persuasive essay about the assigned writing topic.

Part Two: Data Analysis

The collection of qualitative data included student self-reflective journals, field notes documented in a teacher-researcher journal, observational rubrics, semi-structured interviews, summative, structured student Chromebook surveys, and student artifacts. This data collection allowed the teacher-researcher to acquire a thorough description of the engagement and perceptions of third-grade students using Chromebooks during the prewriting stage of persuasive essay writing.

Using the qualitative analysis coding software, NVivo, data were coded into themes and further comparisons were made with categories derived and saturated until conclusions were drawn. During the data analysis, the data were read repetitively and examined until saturation was achieved. The coding of data revealed key words and phrases that identified the most important components of the data through analysis. Next, clustering of the data by gathering related words and phrases into main themes or categories. Once the data were coded, the teacher-researcher discussed the findings and evaluated emergent codes with a veteran English language arts teacher who served as a "critical friend" during the action research study. Collaboration between the teacher-researcher and the critical friend during data analysis improved the reliability of the study by providing a different perspective and alternative interpretation. Further, these themes

or categories were established regarding the research questions, theoretical framework, and the literature.

A thorough analysis of the data after the review and coding process evidenced four emerging themes which are as follows: (a) students felt using technology made writing easier, (b) students were engaged when technology was used during writing, (c) using technology positively impacted the outcome of students' prewriting (brainstorming) for their persuasive essays, and (d) integrating technology with instruction positively influenced students' perceptions about writing.

Theme A: Students Felt Using Technology Made Writing Easier

During the semi-structured interviews, the teacher-researcher discovered that writing was not a favorite academic subject for five of the eight study participants. Mary concurred with Benjamin in his statement that "writing is hard," and Michael explicitly stated, "I don't like to write." George and Ralph described writing as "ok," whereas Kalen, Kerrie, and Lisa stated that they liked to write.

Questions numbered three and seven of the semi-structured interview (see Appendix E) asked participants to reflect on whether technology impacted their writing by inquiring, "How do you like to plan and/or organize your ideas when you write?" and "Did you like using the technology-based graphic organizer to plan or organize your writing?" Seven of the eight study participants responded that they like to use graphic organizers to plan and organize their writing. Two participants, Benjamin and Michael, specifically identified mind maps as their preferred choice of graphic organizers to use when planning and organizing. One participant, Lisa, stated that her method of planning incorporates jotting down ideas without identifying the use of a graphic organizer to plan

116

her writing. When responding to question seven of the semi-structured interview, all eight study participants confirmed that the TBGO helped them plan and organize for their persuasive writing assignment.

In the students' self-reflective digital journal for day two, participants responded to the question, "How can technology and mind-maps help you when writing your persuasive essay?" Participant responses included the following:

"They helped me think about what to write about."

"Technology and mind-maps helped me organize my writing better."

"Technology and mind-maps make writing easier because it helps me plan my writing."

"They can help you get better at planning what you want to write."

"Technology and mind-maps help you organize for your persuasive writing by making a plan and sort ideas."

"Technology makes doing work easier and mind-maps help you organize your ideas by helping not get confused with your ideas."

"Both can help you get organized better."

"Technology and mind-maps help you organize your ideas for your writing and helps you picture what you are going to write about."

To understand the perceptions of students regarding their writing using Chromebooks, participants completed a summative structured Chromebook survey. Questions eight and eleven asked study participants to reflect whether they thought technology made writing easier. Question eight on the survey asked participants to identify their opinion about the following statement: "Using a Chromebook helped me brainstorm and organize my thoughts using mind-mapping when writing my persuasive essay." Five students strongly agreed with this statement, two participants, Michael and

117

Ralph, agreed with this statement, and one student, Mary, was neutral (neither agreed nor disagreed) with this statement. Further, question eleven on the Chromebook survey prompted students to state their view about the following statement: "Using a Chromebook made writing easier." Six of the eight participants strongly agreed with this statement, and two students, Benjamin and Kalen, agreed with this statement. Throughout the study, participants consistently demonstrated behaviors that indicated a disposition that reflected interest and completion related to integrating technology with writing instruction.

Theme B: Students Were Engaged When Technology Was Used During Writing

Research shows that student engagement has been linked to positive learning outcomes (Diemer et al., 2012, p. 14). The teacher-researcher collected student engagement data through classroom observations while participants used Chromebooks when brainstorming and writing their persuasive essays. Descriptive and reflective notes were recorded by the teacher-researcher for each participant twice during the duration of the study.

Each participant was observed two times during the duration of the study, and notes were taken by the teacher-researcher. Evaluation rubrics of student engagement using a Chromebook were used to document participants' behaviors. Six of the eight participants in the research study almost always manipulated the mind-mapping program to demonstrate an understanding of the programming content using their Chromebook, and all students displayed persistence, sustained inquiry, and self-direction for transfer of understanding. Further, these six participants almost always displayed mastery of the TBGO's features by responding to the operational, navigational, and content

organization. Two participants maintained some manipulation of the mind-mapping program to demonstrate an understanding of the programming content using their Chromebook, and both students displayed some persistence, sustained inquiry, and self-direction for transfer of understanding. Additionally, both students did not display full mastery of the TBGO's features, but responded to some operational, navigational, and content organization.

To obtain information regarding student engagement, two questions from the semi-structured interviews, numbers nine and twelve, (see Appendix E) queried, "Using a Chromebook distracted me when I was writing" and "Using the Chromebook helped me stay focused during my work." In reference to question nine, six participants strongly disagreed with this statement. One participant, Ralph, was neutral, indicating he did not agree or disagree with the statement, and the other participant, Mary, strongly agreed with the statement. For question twelve, one participant, Lisa, strongly agreed that using the Chromebook helped her stay focused during her work, five participants agreed with this statement, one participant, Michael, was neutral (neither agreed nor disagreed) regarding the statement, and one participant, Mary, disagreed that using the Chromebook helped her stay focused while working.

Theme C: Technology Positively Impacted the Outcome of Students' Prewriting (Brainstorming) for Their Persuasive Essays

Throughout this action research study, participants demonstrated positive behavior regarding technology integration. Participants seemed comfortable when using their Chromebook, and this seemed to contribute to the positive impact on the students' writing. Student artifacts collected included mind-maps, which served as a TBGO to

119

assist participants when brainstorming for their persuasive essays and those constructed by participants.

A mind-mapping rubric outlined four criteria to assess students' performance when creating mind-maps to help plan and organize ideas for their persuasive essays. The criteria included style, topic, organization, and images with performance indicator levels from one to four, with four being the highest ranking. Within the style category, two of the eight participants (Lisa and Ralph) performed at a level four which indicated they always followed the branching format and color requirements, five participants performed at a level three which indicated they almost always followed the branching format and color requirements, and one participant (Benjamin) performed at a level two which indicated he included some branching format and color requirements. The second category on the mind-mapping rubric emphasized the topic criteria. Two of the eight participants (Lisa and Ralph) executed at a level four which revealed their mind maps included most ideas related to the writing topic and presented multiple words and sentences on all branches, four students executed at a level three which revealed their mind maps had several ideas related to the writing topic and presented multiple words and sentences on many branches. Two participants (Benjamin and Mary) executed at a level two, which revealed their mind maps had some ideas related to the topic and presented multiple words on some branches. Category three on the mind-mapping rubric focused on organization. Three of the eight participants (George, Kalen, and Lisa) performed at a level four, which indicated the reasons they gave to support their opinion branched out from other ideas in a logical manner, and five students performed at a level three, which indicated some of the reasons they provided branched out from other ideas

related to the topic in a somewhat logical manner. The last category on the mind-mapping rubric highlighted the images students used. Three of the eight participants (George, Kalen, and Lisa) executed at a level four, which revealed their mind-maps included thoughtful and relevant images that were related to the writing topic, and five participants executed at a level three, which revealed their mind-maps included some thoughtful and relevant images that were somewhat related to the topic.

Another source of data collection emphasizing this theme, which highlights the positive impact that technology had on the outcome of students' prewriting for their persuasive essay, came from the published persuasive essay written by the participants. A third-grade persuasive writing rubric was employed, which identified five criteria to assess students' performance when writing their persuasive essays. The criteria included focus, organization, development, transition words, and conventions with performance indicator levels from one to four. Within the focus category, three of the eight participants (George, Kalen, and Lisa) performed at a level four, which indicated they effectively introduced the topic and clearly stated their opinion; four participants performed at a level three, which indicated these students introduced the topic and stated their opinion; and one participant (Mary) attempted to introduce the topic and stated her opinion. The next category emphasized the organization component of the persuasive essay. Three of the eight participants (George, Kalen, and Lisa) executed at a level four which revealed that they created an effective organizational structure to group reasons given about the topic, three students (Kerrie, Michael, and Ralph) executed at a level three which revealed that they provided some organizational structure to group reasons given about the topic, and two participants (Ben and Mary) executed at a level two which

121

revealed that they attempted to provide some organization, but structure sometimes impeded understanding of the topic. The third category focused on the development of the persuasive writing. Two of the eight participants (George and Lisa) performed at a level four which indicated that they provided clear and relevant reasons to support their opinion, three participants (Kalen, Michael, and Ralph) performed at a level three which indicated that they provided reasons to support their opinion, and three participants (Benjamin, Kerrie, and Mary) performed at a level two which indicated that they attempted to provide reasons that sometimes supported their opinion. Category four concentrated on the use of transition words in the persuasive essay. Two of the eight students (George and Lisa) executed at a level four which showed they used linking words and phrases effectively to connect their opinions and reasons, five students executed at a level three which showed they used some linking words to connect opinions and reasons, and one student (Mary) executed at a level two which showed she used few linking words to connect opinions and reasons; however, the connections were sometimes unclear. The last category emphasized convention usage in the persuasive essay. One of the eight participants (Lisa) performed at a level four which indicated having very few or no errors in convention usage that inferred with meaning, five participants performed at a level three which indicated having few minor errors in convention usage with no significant effect on meaning, and two participants (Mary and Ralph) performed at a level two which indicated frequent errors in convention usage that sometimes interfered with meaning.

Theme D: Integrating Technology with Instruction Positively Influenced Students' Perceptions About Writing

When technology tools have been thoughtfully deployed with active and social use in the classroom, student engagement is associated with positive learning outcomes (Chen et al., 2010; Nelson Laird & Kuh, 2005; Prince, 2004).

During the semi-structured interviews, the teacher-researcher sought to determine if the influence of technology integration had a positive effect on the participants' perceptions about writing by asking question number eight, "Did the technology-based graphic organizer (mind-mapping) help you plan or organize your writing?" and "How did that change your feelings about writing?" Seven of the eight study participants stated that using technology made writing easier, while one participant (Lisa) indicated that although technology helped her write faster, it did not change her opinion about writing because she "already liked writing." Michael agreed with Benjamin that using the TBGO helped him plan his writing to know what to write for this persuasive essay. George and Kalen emphasized that using technology helped them "write faster." Further, Kerrie highlighted that using technology made her "more excited to write."

Question four of the summative structured Chromebook survey asked participants to identify their opinion regarding the following statement: "I improved my writing while using my Chromebook." Two participants (Kalen and Lisa) strongly agreed with this statement, three participants (George, Kerrie, and Mary) agreed with the statement, and three participants (Benjamin, Michael, and Ralph) were neutral (neither agree nor disagree) that using their Chromebook improved their writing.

123

The last question on the Chromebook survey provided an open-ended question allowing study participants to offer additional comments regarding writing or using a Chromebook in writing. Two participants (Kerrie and Michael) did not respond, while six of the eight participants responded with the following comments:

"I want to use [Chromebook] again."

"I liked using the Chromebook in writing."

"I can't wait to use my Chromebook in writing the next time."

"Writing is fun."

"I liked using finding pictures for my mind-map."

"I hope we use mind-mapping again when writing."

Implications

The current study proposes that planning and implementing technology resources in the English language arts curriculum utilizing a Chromebook may be a potential instructional strategy that educators can use to enhance student achievement, engagement, and motivation. Before employing technology resources in classrooms, educators must consider the impact of these resources on student learning.

Technology use in the classroom has great potential to transform student learning (Parker et al., 2015, p. 105). The implementation of technology into 21st-century learning environments has significant possibilities to increase student achievement, engagement, and motivation. A shift from traditional lessons and pedagogical techniques to encourage and inspire students to write requires educators to embrace innovative approaches to teaching and learning. Further, when students are provided a rich arsenal of learning strategies that incorporate digital tools such as a TBGO as a prewriting strategy, new

124

understandings can be linked with prior knowledge to build a foundation of understanding when writing.

Conclusion

Data collected from multiple sources including student self-reflective digital journals, teacher-researcher journal, performance rubrics, field notes, participant interviews, student Chromebook surveys, and student artifacts were used in the study to measure student engagement and assess students' perceptions. Participant descriptions and the major findings uncovered in this action research study were presented in this chapter. The organization of the findings revealed the study's research questions, themes, and categories.

The data analysis revealed the following four emergent themes: (a) students felt using technology made writing easier, (b) Students were engaged when technology was used during writing, (c) Using technology positively impacted the outcome of students' prewriting (brainstorming) for their persuasive essays, and (d) Integrating technology with instruction positively influenced students' perceptions about writing. The results revealed positive benefits between student achievement, engagement, and motivation and writing instruction when technology was integrated into the English language arts curriculum. The findings from this study offered a source of planning and action to enhance instructional practices in the English language arts curriculum. Further, these findings have the potential to benefit and inform educators of English language arts and instructional technology.

CHAPTER 5

SUMMARY, ACTION PLAN, AND CONCLUSION

This action research study focused on examining the impact of a technology-based graphic organizer (mind mapping) on student achievement, engagement, and motivation when prewriting for a persuasive essay of eight third-grade students at a public school in Fayette County, GA. The school is in a district that has implemented a 1:1 Chromebook initiative were technology is prevalent across all subject areas in grades two through twelfth. The study was conducted to answer the research questions regarding how the implementation of a prewriting strategy, a technology-based graphic organizer (TBGO) as a prewriting strategy, impacts student engagement in an English language arts classroom and what are the students' perceptions of utilizing the TBGO on Chromebooks as a writing tool.

This chapter includes a summary of the major findings to answer the research questions. Further, this chapter offers conclusions and an action plan that may be used to propose changes or improvements to the English language arts curriculum and future implementation in the district at additional grade levels. The suggestions and conclusions are driven by the data collected and perceptions of the participants of the study.

Summary of Study

A study of eight third-grade students participating in persuasive writing activities using 1:1 Chromebook was conducted where data were collected for seven instructional days. Since the research design called for a triangulation of the data using multiple

collection methods, sources included classroom observations recorded through field notes, student self-reflective digital journals, a summative, structured student Chromebook survey, semi-structured student interviews, student artifacts, a teacher-research journal, and a teacher-researcher rubric of five types of student engagement, which was based on a 2011 student engagement framework developed by Schlecty.

During the study, participants engaged in a variety of instructional practices that required them to understand the steps of the writing process, specifically prewriting or brainstorming, and utilized their Chromebook to complete the writing activities. Students retrieved the TBGO (mind maps) and the student self-reflective journals through their Google Drive and shared them with the teacher-researcher to demonstrate their understanding of the activities assigned. Additionally, participants published their persuasive essays (student artifacts) by creating a Google Document and sharing it upon completion with the teacher-researcher. Students expressed their perceptions about using technology (Chromebooks) in writing through a summative, structured Chromebook survey completed using a paper and pencil format. A 15-question semi-structured interview was utilized by the teacher-researcher to ask participants open-ended questions to gain insight into their views about writing and using technology in writing. Further, data collected by the teacher-researcher through classroom observations recorded through field notes were also used to triangulate the data in the action research study.

Merriam and Tisdell (2016) asserted, "In qualitative research in which the researcher is the primary instrument of data collection, subjectivity and interaction are assumed" (p. 147). As the teacher-researcher, I was the primary instrument for data collection and analysis. I recognized my potential for bias throughout each stage of

127

research and acknowledged my prior knowledge of writing and technology. Moreover, I was committed to researching critically and reflectively and strived for disciplined subjectivity to ensure the validity and reliability of the study and its findings.

Summary of Findings

Data analysis revealed four themes: (a) students felt using technology made writing easier, (b) students were engaged when technology was used during writing, (c) using technology positively impacted the outcome of students' prewriting (brainstorming) for their persuasive essays, and (d) integrating technology with instruction positively influenced students' perceptions about writing. Data from the semi-structured interviews discovered that all but one participant, who maintained she felt confident in her planning prior to the study, asserted that the TBGO made writing easier. Further, data from the summative, structured Chromebook survey revealed that most participants agreed or strongly agreed that using their Chromebook helped improve their writing. Additionally, the analysis of the published persuasive essay written by the participants showed positive results in all categories. Data in the five categories revealed the following: (a) in the focus category, seven of the eight participants introduced the topic to state their opinion; (b) in the organization category, six of the eight participants created an organizational structure to their writing by grouping reasons about their topic; (c) in the development category, five of the eight participants provided reasons to support their opinion; (d) in the use of transitional words, seven of the eight participants provided linking words to connect their opinions and reasons; and (e) in the conventions category, six of the eight participants made few errors with no significant effect on meaning in their writing.

The interpretation of the data collected in this study indicated that students' achievement, engagement, and motivation in writing met or exceeded the teacher-researcher's expectations. Further, the analysis of students' perceptions of the use of technology in writing surpassed the anticipated outcomes determined by the teacher-researcher. These results support the adoption of the 21st-Century Connected Classroom Initiative by the school district and help to establish the importance of schools integrating technology into the curriculum to prepare students for the future.

Description of the Action Researcher as Curriculum Leader

The purpose of action research is to generate new knowledge and improve practice (McNiff & Whitehead, 2012, p. 14). Teacher involvement in curriculum development is essential to ensure the content of the curriculum aligns with the needs of the students. Alsubaie (2016) asserted, "With their knowledge, experiences, and competencies, teachers are central to any curriculum development effort" (p. 106).

The teacher-researcher in this action research study sought to contribute to the English language arts curriculum by determining the impact of implementing a TBGO (mind mapping) on student achievement, engagement, and motivation when prewriting for a persuasive essay. As a curriculum leader, the teacher-researcher employed teaching strategies and techniques for this study to meet the needs of the participants while emphasizing 21st-century learning. Further, the teacher-researcher served as a curriculum leader by understanding the educational purposes of the school and district, establishing educational experiences to serve those purposes, and evaluated those educational experiences.

The teacher-researcher was responsible for the implementation of the strategy, collection and analyzing of the data, and interpretation of the findings. In addition, the teacher-researcher led all discussions, recorded all information, and compiled, calculated, and compared all data. The results obtained from this action research study was shared with students, teachers, administrators, and stakeholders. By providing data from the study and serving as a curriculum leader, the teacher-researcher anticipated other teachers in the school and district would want to implement the writing strategy.

Action Plan

The goal of the action research was to expand educational practices in writing and to integrate technology to enhance student achievement, engagement, and motivation. In this qualitative study, the research explored what impact of implementing a prewriting strategy, a TBGO incorporating a mind-mapping program, using Chromebooks to assist students when brainstorming ideas for a persuasive essay, on third-grade students' achievement.

This study was conducted for seven instructional days with specific instructions for each day of the writing workshop. On the first day of the study, the teacher-researcher reviewed the writing process steps—prewriting, first draft, revising, editing, and publishing. Additionally, on the first day of the writing workshop, participants were introduced to the persuasive writing topic—what is the best vacation spot? The teacher-researcher asked the participants to think and select the best vacation spot from the following three choices: the beach, the mountains, or a big city. On day two, the teacher-researcher introduced the TBGO and demonstrated how to access and navigate the TBGO via Google Docs. The third and fourth days of the writing workshop consisted

of the participants brainstorming for their persuasive essay using the TBGO by adding images and words to provide three reasons to support their opinion. Students typed their first draft of their persuasive essay on days five and six using Google Docs and using their TBGO as reference. Additionally, students revised and edited their first drafts on days five and six of the writing workshop. On the last day, students published their persuasive essays via Google Docs.

After the data of the action research had been collected, analyzed, and interpreted, I discussed with students, teachers, administrators, and stakeholders, the results of the action research during the reflection process. This reflection provided a basis for a critical inquiry to evaluate the overall learning experiences for students and receive relevant feedback from others about the action research. This examination of the experience and collection of feedback served as a basis for decision-making and as a source of planning and action. Furthermore, I hoped that the results of this study encouraged other educators to implement the strategy in their classrooms.

Developing an action plan was essential in verifying the importance of this research study's findings. Before developing the action plan, I reviewed the elements of the study, including the topic idea, research questions, research design, data collection methods, and data analysis. The action plan was designed to reflect what I had learned from the study, the steps involved in carrying out the plan, and the resources needed for the plan to be implemented. Further, the feedback gained from students, teachers, administrators, and stakeholders was employed to help formulate an action plan that will meet the needs of all learners.

Mertler (2017) asserted, "Action research provides opportunities for reflecting on where your action research has taken you, what you have learned from engaging in action research, and where your action research can take you as you move forward" (p. 224). This action research has urged me to consider—as technology continues to change, educators must also evolve by integrating technology into the classroom using exciting and meaningful writing experiences to engage students and promote writing development. In addition, what I have learned from engaging in this action research is that by providing students will strategies for success in writing, such as a TBGO to help in the prewriting stage, educators can support critical thinking skills by encouraging students to organize their ideas about specific themes and create a visual representation of their thoughts. Further, as I move forward in education, this action research provides a focus to teach 21st-century skills necessary for students to be responsible in the digital world in which we live. These real-world connections and authentic learning experiences integrating technology into the English language arts curriculum enhance the unlimited possibilities for students to explore, connect, create, communicate, and learn.

Recommendations for Policy/Practice

The teacher-researcher recommends the implementation of TBGOs (using mind-mapping) as a prewriting strategy for elementary students not only for persuasive writing but also for narrative and expository writing. This action research demonstrated that third-grade students could improve their writing skills when they are provided effective learning strategies. For this reason, upper elementary students in grades three through five need to receive this learning strategy. The teacher-researcher also recommends incorporating the learning strategy in second grade to provide earlier strategies for

developing writers. Further, effective learning strategies in earlier grade levels could improve writing, enhance student engagement and motivation, and create positive attitudes about writing.

Implications for Further Research and Practice

This study has established some pedagogical affordances related to the use of TBGOs in elementary education. The technological characteristic of utilizing the TBGO to enhance the prewriting phase of the writing process proves to be an essential feature because it can foster students' critical thinking and organizational skills. These technological affordances of the TBGO provide students the opportunity to "map out" their ideas prior to engaging in the composition of writing. Previous research shows the need to disclose evidence on the effectiveness of different types of writing interventions (Rosario et al., 2019, p. 2). By offering a writing intervention such as a TBGO, students who may have difficulty developing and organizing their ideas when writing will have a tool to help them generate ideas or elaborate on them when prewriting. The data from this research study is expected to help researchers, teachers, school, and county administrators to prioritize using technology interventions to support the English language arts curriculum.

Based on the findings of this study, the following recommendations for future studies are offered:

1. Because the current study's observations were for short durations for each participant, the two-time observations may have limited the observations of students' academic and behavioral patterns not represented during the writing period observed for each participant. It would be recommended that added

133

observation periods for each participant be included to determine if additional observations would produce different results.

2. The present study consisted of only students in the third grade in the elementary school. It would be recommended that additional grade levels, including fourth and fifth grades, be incorporated to determine if students at different grade levels have similar results.

3. This study examined the impact of a TBGO (mind mapping) on student achievement, engagement, and motivation when prewriting for a persuasive essay. Another recommendation is to examine the impact of a TBGO when third graders prewrite for a narrative or expository essay.

4. Because of the findings in this study, I recommend professional development for teachers in grades three through five that emphasizes TBGOs, specifically mind-mapping, to offer practical applications and ideas for incorporating TBGO into the English language arts curriculum. By providing opportunities for teachers to broaden their knowledge base, educators will be better equipped to meet the needs of 21st-century learners.

Conclusion

In today's 21st-century classrooms, educators must find ways to motivate this always-connected, digitally advanced generation of students who actively engage and interact outside of school via texting, gaming, social media, and the Internet. The 1:1 Chromebook initiative implemented by Fayette County Schools has provided learning opportunities for students to establish a foundation for a 21st-century curriculum. By providing students with opportunities to use technology to enhance their writing,

134

educators foster a learning environment that reflects current exchanges and interactions as well as encourages students to be active participants in the development of their ideas in our global environment.

This action research study examined eight third-grade students using a TBGO (mind mapping) to brainstorm or prewrite for a persuasive writing activity. The participants used their Chromebooks to create mind maps outlining reasons to support their opinions about a specific writing topic. Students were asked to generate mind maps containing words and images to help them organize their ideas through visual representations. Further, students used their mind maps to plan and publish their persuasive essays.

The increase in student achievement, engagement, and motivation evidenced in this study encourages the use of TBGOs in the English language arts curriculum in other grade levels. Since our school district has adopted a 1:1 Chromebook initiative in grades two through twelve, the implementation could take place immediately in alignment with grade-level standards.

To dig deeper into the impact of the use of TBGOs (mind mapping) in writing, an extension to this action research study could be to implement the use of mind mapping when students are writing narrative or expository essays. When writing a narrative essay, mind mapping could involve having students brainstorm ideas to support the narrative topic. Additionally, students could use mind mapping to help brainstorm and organize facts when writing an essay about an expository topic. These suggestions about potential action research explorations may extend data collection regarding the impact on student

achievement, engagement, and motivation when using a TBGO during the prewriting stage.

The results of this study were supported in best practices and research conducted by a veteran educator highly qualified in the field of English language arts. The findings revealed that the participants' perceptions about writing improved when technology was incorporated into the writing curriculum. The data also revealed that students' achievement and motivation increased when a TBGO was implemented to help them brainstorm before writing their persuasive essays. The results of this study were consistent with the literature and research that emphasized that when educators blend proven pedagogy and curriculum with technology integration in innovative and meaningful ways, students respond positively and productively. Because of this study, I expect English language arts teachers at various grade levels to incorporate TBGOs in their instructional practices as writing teachers to promote their students as 21st-century writers.

In conclusion, to prepare students for our globally connected society, educators must provide students with engaging learning opportunities using 21st-century technology. By providing authentic writing experiences that utilize technology, students are given the opportunity to understand the process of writing which encourages them to express themselves through written communication.

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144

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APPENDIX A

EVALUATION RUBRIC OF 5 TYPES OF ENGAGEMENT USING A

CHROMEBOOK

Student: _____ Date_____

Directions: Please indicate how often the student engaged in the identified behavior for each statement below.

Engagement Student manipulates mind-mapping program features by utilizing the functions to test personal understanding of the programming content.	Almost Always	Often	Rarely	Never
Engagement Student manipulates Chromebook to navigate the mind-mapping program to allow the student to reflect on personal values or experience.	Almost Always	Often	Rarely	Never
Strategic Compliance Student shows some understanding of mind-mapping program but may not display full mastery of mind-mapping features.	Almost Always	Often	Rarely	Never
Ritual Compliance Student does not interact with the mind-mapping program while using the Chromebook and may seem disinterested to expectation of the assignment.	Almost Always	Often	Rarely	Never
Rebellion Student tries to interact with the mind-mapping program but is unsuccessful and may display frustration including confusion, aggressive behavior, erratic behavior, signs of agitation, distress, or anxiety.	Almost Always	Often	Rarely	Never

162

APPENDIX B

STUDENT CHROMEBOOK SURVEY

Rate the statements using the scale: 5=strongly agree, 4=agree, 3=neutral, 2=disagree, and 1=strongly disagree.

	Strongly Agree	Agree	Neutral	Dis-agree	Strongly Disagree
1.The use of a Chromebook helped me learn in this class.	5	4	3	2	1
2.The Chromebook is a useful learning tool.	5	4	3	2	1
3. Using a Chromebook helped me during writing.	5	4	3	2	1
4. I improved my writing while working on a Chromebook.	5	4	3	2	1
5. The Chromebook helps my teacher teach me better.	5	4	3	2	1
6. Using a Chromebook helped me learn by using technology.	5	4	3	2	1
7. The Chromebook allowed me to move which helped me learn.	5	4	3	2	1
8. The Chromebook helped me organize using mind-mapping.	5	4	3	2	1
9. Using a Chromebook distracted me when I was writing.	5	4	3	2	1
10. Using a Chromebook motivated me to learn.	5	4	3	2	1
11. Using the Chromebook made writing easier.	5	4	3	2	1
12. The Chromebook helped me stay focused during my work.	5	4	3	2	1
13. I enjoy using a Chromebook for class activities.	5	4	3	2	1
14. Using the Chromebook helped me be creative in writing.	5	4	3	2	1
15. Using the Chromebook helped me concentrate better on my writing.	5	4	3	2	1

APPENDIX C

TEACHER-RESEARCHER JOURNAL (FIELD NOTES)

Date:	Class:
Start time:	End time:

Research Question: How does the implementation of a prewriting strategy, a technology-based graphic organizer (TBGO) as a prewriting strategy, impact student engagement in an English language arts classroom?

Name	Date	Time	Observations (Descriptive)	Preliminary Interpretations (Reflective)
Benjamin		Start: End:		
Benjamin		Start: End:		
George		Start: End:		
George		Start: End:		
Kalen		Start: End:		
Kalen		Start: End:		

Kerrie		Start: End:		
Kerrie		Start: End:		
Lisa		Start: End:		
Lisa		Start: End:		
Mary		Start: End:		
Mary		Start: End:		
Michael		Start: End:		
Michael		Start: End:		
Ralph		Start: End:		
Ralph		Start: End:		

Research Question: What are the students' perceptions of utilizing the TBGO on Chromebooks as a writing tool?

Name	Date	Time	Observations (Descriptive)	Preliminary Interpretations (Reflective)
Benjamin		Start: End:		
David		Start: End:		
George		Start: End:		
Jennifer		Start: End:		
Kalen		Start: End:		
Kerrie		Start: End:		
Larry		Start: End:		
Linda		Start: End:		
Lisa		Start: End:		
Maryanne		Start: End:		

Michael		Start:		
		End:		
Missy		Start:		
		End:		
Ralph		Start:		
		End:		
Thomas		Start:		
		End:		

APPENDIX D

STUDENT DIGITAL JOURNAL

Student Self-Reflective
Digital Journal (Day___)

Date:_____

Directions: Answer the following question in the box below.

Question:

168

APPENDIX E

THIRD GRADE INTERVIEW QUESTIONS

1. Describe your feeling about writing.

2. What types of things do you like to write about?

3. Describe how you like to plan and/or organize your ideas when you write.

4. Describe your feelings about using a Chromebook.

5. What are some activities you like to do using your Chromebook?

6. Do you like using your Chromebook in writing?

7. Did you like using the technology-based graphic organizer to plan and/or organize your ideas?

8. When you got to use the technology-based graphic organizer to help you plan and/or organize your writing, how did that change your feelings about writing?

9. What was the best part about using technology during writing?

10. Is there anything else you would like to share about writing and/or using your Chromebook in writing?

MIND-MAPPING RUBRIC

Student: _____ Date_____

Criteria	Level 1	Level 2	Level 3	Level 4
Style	Does not follow branch format and not color present	Includes some branch format and color	Almost always follows branch format and color	Always follows branch format and has color
Topic	Mind map includes limited ideas related to topic; presents only one word per branch	Mind map includes some ideas related to topic; presents multiple words on some branches	Mind map has several ideas related to topic; presents multiple words/sentence on many branches	Mind map includes most ideas related to topic; presents multiple words/sentence on all branches
Organization	No reasons branch out from other ideas, no logical manner	One reason branches out to another idea, but not in a logical manner	Some reasons branch out from other ideas in a somewhat logical manner	Reasons branch out from other ideas in a logical manner
Images	Image represented not related to topic	One thoughtful and relevant image presented related to topic	Some thoughtful and relevant images presented that are somewhat related to topic	Thoughtful and relevant images presented that are related to topic
Total				

APPENDIX G

THIRD GRADE PERSUASIVE WRITING RUBRIC

Student: _____ Date_____

	Focus	**Organization**	**Development**	**Transition Words**	**Conventions**
4 Well-developed, supports a point of view with reasons	Effectively introduces a topic and clearly states an opinion	Creates an effective organizational structure to group reasons	Provides relevant reasons to support the opinion	Uses linking to connect opinions and reasons	Few or no errors in usage and/or conventions
3 Somewhat supports a point of view with reasons	Introduces a topic and states an opinion	Some organizational structure to group reasons	Provides reasons to support the opinion	Uses 3-4 linking words to connect opinions and reasons	Few minor errors in usage and/or conventions
2 Incomplete and partially supports a point	Attempts to introduce a topic and state an opinion	Limited organizational structure to group reasons	Attempts to provide reasons that sometimes support the opinion	Uses 1-2 linking words to connect opinions and reasons	Has frequent errors in usage and conventions
1 Incomplete and does not support a point view	Does not introduce a topic or state an opinion	Does not have any organizational structure	Does not provide reasons to support the opinion	No linking words to connect opinions and reasons	Frequent major errors in usage and conventions
Total					

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171

APPENDIX H

STUDENT MIND MAP

Mind Map

By_____

The second reason why this is the best vacation spot is

_____

(insert picture)

Reason #2

The first reason why this is the best vacation spot is

_____

(insert picture)

I think the best vacation spot is

_____.

(insert picture)

Reason #1

The third reason why this is the best vacation spot is _____

(insert picture)

Reason #3