

THE CRAFTSMANSHIP OF CRITICAL THINKING

A Dissertation

Submitted to the
Faculty of Argosy University Seattle
College of Education
In partial fulfillment of
the requirements for the degree of
Doctor of Education

by

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To my teachers and students, thank you. You have provided me with the experiences on which I have made meaning. Each one of you has contributed to the development of my thinking. Each time I hear, “Oh, that question makes my head hurt.” I know we are on the right track. I get so excited when we create visual representations of our thinking and your face

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suddenly lights up as you exclaim “Oh, now I get it!” I am honored by your greetings of, “Hi, Brain Pain Lady. Can you come to your class today?” Together we have learned from each other and developed a thirst for more. It is my hope that this love of learning only grows in all of us.

Dedication

This dissertation is dedicated to my grandfather Urcell Maynard Johnson, 1909-1959. He chose to tend to the needs of his family instead of furthering his education. He taught at the Minnesota School of Business, was the first instructor in MN for the Dale Carnegie Institute, and taught at other institutions of higher learning. His passion for education was intertwined with his lived faith and surpassed only by his loving commitment to his family. A Deacon of the Mizpah Congregationalist church, Free Mason, Principal, and Superintendent of Schools (Montrose, Granada, and Sacred Heart, MN) his passion and commitment continues to influence his family generations later.

The Problem

In December of 1990 I graduated with a B.S. in Elementary Education and my initial teaching certificate. I quickly put both to use as a substitute teacher in hopes of landing a fulltime classroom position the following year. As a new teacher moving between classrooms, schools, districts and states I noticed a few patterns repeating themselves. Students seemed reluctant to think for themselves and yet found a source of pride and purpose when doing so. Critical thinking seemed to be treated as an extra and rarely given instructional time. Teachers and parents often complained that students lacked common sense and the ability to apply academic knowledge appropriately.

As I developed my teaching skills in several fulltime positions I was like most new teachers. I was idealistic and overwhelmed by the amount of work that had to be done. I kept asking my colleagues how they managed everything and what they did to increase efficiency and productivity. Through repeated inquiry and my own personal exploration I found a few pearls of wisdom that have served me well. Using visual tools is one such gem that helps students understand and apply content knowledge as well as increase teacher effectiveness.

As an undergraduate student I was introduced to cognitive webs and used them extensively as I studied psychology. As I began studying education I studied many note taking styles and graphic organizers. I shared them with students and experienced success. As an experienced teacher I found creating a new visual tool for every concept I presented to students to be a lot of work and somewhat confusing. I knew there had to be an easier and more meaningful way. I hoped completing a Masters degree in Curriculum and Instruction might provide the insight I sought. While many of the courses had positive impacts on my classroom instruction, none really addressed my underlying questions. What tools are most likely to increase my effectiveness as a teacher and student academic performance?

In 2003 I was introduced to Thinking Maps® and immediately began using them across content and encouraging students to express their own thinking using the maps. That first year my students showed significantly more engagement in our classroom activities. They were more interested in what others thought and better able to articulate their own thoughts clearly. They sought out academic vocabulary and used it. They encouraged each other to think about their own actions and thoughts. I was amazed at the dramatic change in social dynamics I was seeing. I wondered if this was just this group of students or if Thinking Maps® were responsible for this positive change in student behavior. Then the state test scores came in and more than twice the number of students from my class scored at the proficient level than the previous year.

Each year that followed I experienced the same social and academic changes. Each year the students appeared to be slightly more sophisticated in their use of the maps and their expression of their own thinking. Interestingly, so was I. I saw the thought patterns more clearly and was better able to help students clarify their own thinking. The standardized test scores of my class remained equal to or higher than my grade level colleagues even when my class had significantly more students with special needs like English language acquisition or a specific learning disability.

At the same time I discovered Thinking Maps® I was awarded a grant by the Bill and Melinda Gates *foundation*. I participated in the Teacher Leadership Project, which provided hardware and software for my classroom as well as extensive training in its use. Part of the training included creating thematic units that integrated all subject areas using the framework of Understanding by Design (Wiggins & McTighe 1998, 2004,2005). I was connected to a large network of teachers doing this same type of instruction. The collaborative and energetic

approach to developing these intricate unit plans was invigorating. As I started using this training in my classroom I wondered if the integration of content areas, workshop style teaching methods, and thematic structure was also in part responsible for increased student academic performance.

I incorporated student feedback on my teaching strategies and lesson content as a routine part of each week. Students voluntarily asked what the next project I was preparing was and offered suggestions. They beamed with pride when their suggestion was implemented or discussed with the class. I wondered how much impact my newfound professional support and excitement was impacting student performance. After a few years, content integration, meaningful real life application, and honest rapport centered on student academic performance became the routine litmus test for my teaching. I was immersed in adapting these practices to revised state academic standards and new district mandated curriculum. I continued to wonder just how much each of these elements truly impacted my student's academic and social performance: visual tools, thematic content integration, meaningful real live application, my own enthusiasm, workshop style instruction, personal rapport building, and immediate student feedback on my instruction.

I was not the only one wondering what was happening in my classroom. Colleagues would comment that they could tell which students in their class had been my students. Colleagues commented that they were consistently collaborative and actively engaged in wanting to know more. Failure was not a concern and they boldly tested their ideas on their own. My former students took transition and changes in routine that tended to be difficult for peers to handle in stride. Colleagues frequently shared stories with me about how a student performed amazingly well on a task, when asked how they did it, the student responded with some strategy that they learned while in my class. I wondered what collection of experiences

really helped students build these thinking habits that made them successful.

It is based on these wonderings that I embarked on my doctorate in education. It is from this thread woven through my teaching experiences that I have developed and refined the basic questions that form the foundation of this dissertation.

The Problem Statement

Recent legislation and educational trends have brought critical thinking to the forefront of American education. A poll conducted by Peter D. Hart Research Associates on behalf of the Partnership for 21st Century skills found “sixty-six percent of voters say they believe that students need more than just the basics of reading, writing, and math; schools also need to incorporate a broader range of skills (PR Newswire Association, 2007).”

This is evidenced by the content of many state standards. One example is the Washington State Essential Academic Learning Requirements in reading. Several specific standards require students to demonstrate their understanding of what they read in ways that involve critical thinking. The most obvious is component 2.4 (Appendix A). Drawing conclusions, analyzing the author’s purpose and providing text-based information or specific details from the text to support reasoning are expected student behaviors. Expressing personal insights based on the text is another student behavior expected in this state standard. The specific reasoning behavior of making personal decisions based on specific referenced details is an implied hallmark of critical thinking in the state standards for reading. Thinking critically involves: behavior, language, analysis, literary purpose and perspective as shown in the example in Appendix A (<http://standards.ospi.k12.wa.us/>).

The skills and resources needed within the workforce are changing dramatically. Each day new technologies are invented or applied in new ways. This presents a daunting challenge for educators. The students in classrooms today need to be prepared for jobs that do not exist and be prepared to continually adapt to an ever-changing environment. Critical thinking can increase student success in the face of these challenges. The use of visual tools to organize thoughts can aid in developing complex and flexible thinking (Sprenger, 1999).

“To be effective in the 21st century, citizens and workers must be able to

communicate, to team, to continuously learn, and to function in a visual, data-rich society. The school and community must emphasize the increasing importance of learning to learn in light of the shift to a digital age that values intellectual capital. This vision redefines the purpose of public education. The school's vision must seek to create learners who have the self-confidence, independence, and high-tech proficiencies to continuously learn-meeting challenges innovatively and creatively (Partnership for 21st Century Skills, 2007)" (Costa & Kallick, 2008, p. xxiii).

Costa and Kallick define these 21st century skills within the context of their work in Habits of Mind. They list eight skills needed to be successful in the 21st century: Creativity and Innovation, Critical Thinking and problem solving, Communication and collaboration, Flexibility and adaptability, Initiative and self-direction, Social and cross-cultural skills, Productivity and accountability, and Leadership and responsibility (2008, p. xxiii).

Problem Significance

Current trends in education have placed an emphasis on critical thinking skills (Noddings, 2008; Costa, 2008; Ritchart & Perkins, 2008; Ivey & Fisher, 2006). No child left behind (NCLB) legislation has mandated the creation of content standards for student learning (Department of Ed., 2008, Part b.1 of section 1111) by outlining the criteria each state must use to develop academic learning requirements for all students. State standards must be specific, coherent, rigorous, and encourage the teaching of advanced skills.

Many of the standards developed by states include elements of critical thinking skills. The state of Washington used language that implies the student development of critical thinking skills in the state standards. As outlined in section 1111 of NCLB legislation this means that the state must also monitor the development of these elements of critical thinking by a standardized test, and report to the results to the federal agency each year.

The focus on thinking skills may be a response to recent demands of employers and an information-flooded society. Employers are looking for a new set of skills from employees. The abilities to think critically and apply knowledge to new situations are among the most frequently mentioned (Heerwagen, 2007). We must prepare our students for a society and workplace that requires them to continually reassess their knowledge and abilities in order to adapt to the ever-changing demands that will be placed on them. Just as today's employees were educated in a system that had not conceived many of today's jobs, to an even greater extent today's education system is also charged with educating today's students for unimagined possibilities.

Using the knowledge gained through brain research and educational practices teachers see the value of graphic organizers to clarify thinking and increase retention of information (Sprenger, 1999). Our bodies are designed to rely heavily on visual information.

Our eyes are the site of 70% of our body's sensory receptors (Sylwester, 1995, p.61)

Sylwester (1995) describes an intricate network of cells, organs, and chemicals that work together simultaneously to process a multitude of messages. The concept of the brain as a complex network is a basis for the instructional strategy of organizing thoughts. The visual organization of thoughts in graphic organizers and cognitive webs take into account the brain's high percentage of visual receptors. If a series of visual network-like structures could be connected with specific thinking skills, the natural organization and preferred receptors of the brain could be intentionally used to develop critical thinking. The use of a visual language called Thinking Maps® does just that and has demonstrated an even greater positive impact on the depth and clarity of student thinking than graphic organizers (Hyerle, 2004). The rationale for and uses of Thinking Maps® reveal a potentially significant tool for developing critical thinking, reflection, and academic abilities.

While teachers work to build the academic skills of students, cognitive behavior is also a frequent reason cited by teachers for poor student performance. A student's ability to focus on a task long enough to complete the work and the quality of attention paid to the task are undeniable factors of academic success. The Habits of Mind (Costa & Kallick, 2000) approach offers practical and specific applications for classroom instruction. If teachers and students can intentionally work toward a practical classroom environment that builds thought patterns necessary to be successful in any situation, students will truly be prepared for the rapidly changing world into which they will be thrust.

Constructivist pedagogy offers a foundation in which to resolve these issues faced by educators. In constructivist theory the teacher guides the student from their current understanding and experience to intentionally orchestrated discoveries of meaningful content. A student's current academic strengths and understanding are the starting point of

constructivist teaching. The goal is not regurgitation of information or mindless performance of tasks on queue. The goal of constructivist education is for each individual student to construct a personally meaningful understanding of carefully scaffolded academic content. This means that the student will be able to apply concepts in a variety of situations and make connections between concepts based on personal understanding and experience. At it's best, constructivism fosters student curiosity and depth of understanding; they confidently question, justify, and independently explore complex ideas. Constructivist theory supports the use of student created visual representations of ideas because students explore concepts on their terms and discover meaning for themselves. Constructivist theory also supports the intentional development of thinking behaviors that lead to academic success. Habits of Mind, for example – focused attention to these intelligent behaviors that lead to greater personal understanding of concepts.

Having a clear pedagogy on which to plan instruction and create a positive learning environment for students forms the foundation for teacher and student success. Practicing methods of instruction aligned with a single pedagogy for all content areas simplifies the complex task of education. Constructivism provides this foundation of consistent simplicity that can be applied to all content areas. Teachers can rely on one set of classroom routines and behaviors for all subjects instead of compartmentalizing methodologies by subject. Students benefit from the clarity and simplicity of a unified presentation and set of expectations leaving more time and energy for the exploration of content. Constructivism also supports students as they prepare for a future that will require them to develop interdependent and unique perspectives based on a solid understanding of concepts.

Problem Background

Current mind brain research has revealed that the brain physically connects like information (Howard, 1994; Jensen, 1998; Sprenger, 1999; Sylwester, 1995). This suggests a scientific basis for chunking information, making cross content connections, and encouraging students to connect new information to real life situations (Jensen, 1998; Sprenger, 1999). The incorporation of an emotional or meaningful connection further connects new content to familiar content thus increasing the likelihood of retaining the information for later use (Howard, 1994; Jensen, 1998; Sprenger, 1999; Sylwester, 1995).

The amount and distribution of the sensory receptors in the human body also explains why visually organizing information would lead to greater retention of information. With our eyes containing 70% of our sensory receptors (Sylwester, 1995, p. 61), and the brain seeking patterns, visually representing and organizing information helps us use our available sensory resources effectively. The use of thematic teaching and other cross-curricular teaching strategies find a base in this same research (Jensen, 1998; Sprenger, 1999).

In practice, teachers and students are finding it difficult to take the time to make these connections. Teachers are pressured to use contact time with students to present new material or drill content that should be secure and easy for students to retrieve from their minds. Students are overwhelmed with a glut of information streaming at them as from a fire hose. Students become overwhelmed by facts that flood over them and wonder. What does it mean? What do I do with it? How do I manage it? Do I need to pay attention? Do I need to know this? They often become confused and ineffective. In an attempt to survive students often chunk information by rather limited categories that make retrieval difficult. Students tend to dump most of what they study after exams. Students rarely make connections between curriculum content areas such as math and reading or connect academic learning to real life

situations. Sylwester ((1995, p. 102) offers an analogy to explain why students and teachers struggle with making meaning of school experiences.

“A school functions somewhat like a daytime sleeping and dreaming. Recall that six hours (75 percent) of our nighttime focuses on creation of and editing of memory networks, and two hours (25 percent) involves dream periods in which the networks are randomly activated and organized into dream stories. This setup sounds a lot like school. Teachers tend to focus more of their time and energy on teaching new information (i.e. creating memory networks) and less on using that knowledge in such social problem situations as discussions, games, simulations, role playing, story telling, music, and art (i.e. circuit testing).”

Through assisting students in making their own meaningful connections through reflection, using a visual language, and discussion the implications of the content, meaningful understanding can be achieved (Howard, 1994; Jensen, 1998; Sprenger, 1999; Sylwester, 1995). Leigh Chiarelott (2006) describes six different learning models that contain these elements to varying degrees: Concept Attainment Inductive, Group Investigation, Inquiry, Synetic, and Self-Directed. Chiarelott’s Self-Directed learning model is most aligned with the purpose of this study. In the Self-Directed learning model learners diagnose their own needs, set their own goals, design their own path for meeting their goals and assess their own progress toward their goals (Chiarelott, 2006, p. 123). Once the content is better understood by making connections to familiar content and personal relevancy, retention of the new learning is aided (Chiarelott, 2006, p. 22-23). The Self-Directed learning model supports a

constructivist pedagogy because of its learner directed focus.

This ability to filter relevant and irrelevant information peaks in the late teens or early twenties (Sprenger, 1999; Sylwester, 1995). What mature adult has not spent significant time looking for their keys, glasses, or the reason they came into a room? This is not a memory problem. It is a filtering problem. Faced with the glut of information and limited storage and handling resources many pieces of information are quickly discarded before being considered for storage. The true challenge set before our brains and us is developing a practical and efficient means of determining what information is important and where to store the important information for speedy retrieval. It is even more essential today that students become proficient in filtering relevant or key content from the trivial or distracting information in order to function well.

Students today must become craftsman of their own thoughts more than at any other time in our history. A true craftsman uses a set of tools to complete complex, technical, and aesthetically pleasing works of great quality. This is the task of today's student and the great thinkers of every generation. Now students must know what they know as well as what they do not know. They must have a toolbox of strategies at hand to gain needed information and thinking patterns. They must know what strategy to use in each unique situation to construct a meaningful concept. They must not be distracted by irrelevant ideas that clamor for attention. Any irrelevant ideas must be chipped away and discarded just as a master sculptor must chip away and discard the excess stone.

This task of critical thought has become more refined as our society has become more complex. The quantity of concepts that American students are mandated to learn by state laws is overwhelming; this prompts a natural conversation among educators, researchers, parents, employers, and policy-makers. Some say students must be familiar with many

concepts and others say it is more valuable to know a few concepts well. This important debate raises the question of breadth versus depth. This research project will focus on the depth and sophistication of thought as a measure of critical thinking.

Teachers and students are in need of tools and methods that help students effectively make sense of concepts. Tools that are effective for many students and across content areas provide significant benefits over more limited tools. While working with in the norms of a public school district, and Federal grant specifications, the researcher will analyze the effectiveness of specific routine practices and tools.

Purpose of the Study

The focus of this research project is to investigate how Thinking Maps® can be used as a reflective tool. Thinking Maps® were used to assist students and researcher in clarifying and communicating their understanding of key academic content. Other visual tools and uses of these tools may be employed by teacher and students but they will not be the focus of this research project and data will not be collected on any other visual tool or other use of a visual tool.

The purposes of this study are:

- Use Thinking Maps® as a visual tool to record thinking and enhance Metacognition by making thought focused, explicit, and intentional.
- Identify how Thinking Maps® affects critical thinking when used as a review and reflection tool.
- Determine if the changes in thinking connected to Thinking Maps® become Habits of Mind.
- Identify further evidence of connections between Thinking Maps®, critical thinking, Habits of Mind, and academic performance.

Importance of the Study

Connections between the use of Thinking Maps® and reflection focused on academic content may have significant implications for teaching and learning. NCLB has firmly focused on student performance on standardized tests and content standards. Enhancing the application of mind brain research through reflection should provide teachers and students with practical and easy to use visual tools that will enhance reflection and critical thinking for increased student learning and performance. The cross-curricular application of a single visual language within a school will intensify the intentional focus on academic thought. With a focus on the depth, quality, and organization of student thought provided by Thinking Maps®, teachers have new insight into student understanding and perception that can be used to tailor instruction.

Connections between Habits of Mind and classroom practices provide useful insight into the effectiveness of classroom practices. Intentional development of habits that have been identified as hallmarks of cognitive success is an implied outcome of education. Habits of Mind as a classroom practice shows potential for enhancing the thinking habits of students. Habits of Mind also has classroom implications for the enhancing student understanding of academic content and performance on standardized assessments.

Practices that enhance the thinking habits can also be used across the curriculum and should be practical and easy to implement in the classroom. Providing students and teachers with an easy to use, practical, flexible and focused set of tools to develop thinking skills and habits that promote academic success regardless of content will empower students and teachers to seek and enjoy the pursuit of understanding.

Teachers and students are in need of tools and methods that help students effectively make sense of concepts. Teachers have very strict time constraints within which to work.

Resources are limited and expectations for student achievement are high. In order for students to gain maximum progress they need to see connections between concepts quickly. Students need simple to apply tools for expressing complex thoughts in order to truly grapple with and gain understanding. Identifying effective instructional tools and strategies can provide a stable base for academic performance. The benefits of effective tools are many. Students and teachers find them easy to use. Because they are easy to use these tools are more likely to be used. Effective tools are flexible because they are easily adaptable. Tools that can be adapted to individual needs and any situation or content are highly desirable. Effective tools also grow with individuals and grow in complexity with the user. The focus on content ideas and how the ideas are organized helps the user to stay focused on the ideas and build a stable base from which student academic performance can be enhanced efficiently.

Application of visual tools, academic thinking behaviors, open discussion of student thought and teacher questioning are a practical and effective means for positively impacting student behavior. These techniques can be used in any academic context and with any curriculum.

Research Questions

When a teacher uses Thinking Maps® to review academic content with students and as a tool to help students determine what they know, determine what they don't know, make connections to other academic content, make connections to real life, and set personal learning goals consistently in multiple contexts; do students show evidence of developing Habits of Mind? Some applied examples include:

- Do students use compare and contrast (Double Bubble) thinking spontaneously, with peer prompting, or with teacher prompting?
- Do students make connections between content areas spontaneously, with peer prompting, or with teacher prompting?
- Do students identify patterns in their own thinking (metacognition) spontaneously, with peer prompting, or with teacher prompting?
- Do students continue to work on an assignment even when experiencing difficulty?
- Do students return to assignments to improve their work?
- Do students seek assistance when having difficulty expressing their thinking?
- Do students use examples of real life experiences used to explain academic content?
- Do students articulate personal goals?
- Do students have a realistic plan to achieve personal goals?
- Do students put their plans to achieve goals into practice?
- Do students share their goals and their plan with peers and adults that can assist?
- Has student behavior changed after learning about Habits of Mind?
- Do students identify or discuss specific Habits of Mind with others?

When a teacher spends proportionally more instructional time on constructivist activities using Thinking Maps® and proportionally less time on teacher directed lecture, what evidence of critical thinking and Habits of Mind become evident in student work? Some applied examples include:

- Are content specific words from texts used in student discussion or written work?
- Do students ask for more specific vocabulary or examples?
- Do students use their own examples to explain concepts?
- Are student discussions focused on the topic or does the conversation veer off topic?
- Is more than one explanation/description of a topic given by students?
- Do students review and make changes to earlier work?
- Do students refer to previous work when discussing or completing current work?
- How has student work changed after learning about the Habits of Mind?

Methodology

This research study used qualitative action research within an educational setting. This was an archival study of the researcher's own classroom teaching. Action research provided the most appropriate research methodology for this research project. The researcher began the process of selecting the research methodology with a topic and setting for the research in mind. With the topic and setting in mind the researcher began to eliminate possible research methodologies. Quantitative and qualitative methods both offered a well-established format for a possible research project. The setting of a public elementary school limited the degree to which each could be used. The integrity of the educational environment and anonymity of participants had to be protected. Quantitative data (Jackson, 2006) was limited in the setting of this research project and did not serve to answer all aspects of the refined research questions of this research project. The reliance on the analysis of sets of numerical data found in quantitative research seemed to only partially answer the questions of this researcher. Qualitative data (Patton, 2002) provided more rich data from which this researcher could derive answers to the research questions. This researcher felt that both qualitative and quantitative data would be useful in answering the research questions. This conclusion led the researcher to explore research designs that incorporated both qualitative and quantitative methods.

This researcher also considered the realities of the setting in which the research would take place. The research took place in a public elementary school. The best interest of the student-participants had to be the primary concern of the researcher. The regulations and expectations applicable to an employee of the public school must be accommodated within the methodology of the research project. The researcher felt that using a method involving treatment and control groups was inappropriate. The researcher believed that the research

topic involved instructional methods beneficial to students (Hyerle, 2004) and should therefore be provided to as many students as possible. The specific situation in which the research occurred also did not provide for a manageable way in which to collect adequate data on both a control and treatment group. The researcher worked with only one other teacher at the researcher's site and no other same age/grade classrooms. Collaboration on a research project with a teacher at another program site during the sixteen days of the summer program would have been unreasonably difficult to manage.

Program Evaluation (Fitzpatrick, Sanders, & Worthen, 2004; Wholey, Hatry, & Newcomer, 2004) was eliminated as a methodology for this research project. This research project did not seek to evaluate a clearly defined curriculum or highly structured sequence of tasks. The researcher did not seek to determine if a clearly defined program was being implemented with fidelity. The quality of a program was not being considered. The researcher did not wish to determine the perceived effectiveness of a clearly defined program. For these reasons the researcher chose not to select program evaluation for this research project.

In reflecting on the research questions, the researcher's ultimate goal to produce a research study that was immediately applicable to practitioners, and the setting in which the research took place; this researcher came to the realization that action research provided the most appropriate research methodology. Action research occurs within a real life situation. The researcher collects data, analyzes the data, draws conclusions, and repeats the process. This cyclical nature of action research is the daily routine of a competent educator. Instruction and environment are adapted continually to support student learning. Action research provided a structure and focus for the real work of education; learning with.

The definition of action research by Herr & Anderson (2005, p. 3) resonated with this researcher.

Although the plethora of terms coined to describe this research reflects wide disagreement on many issues, most agree on the following: action research is inquiry that is done *by* or *with* insiders to an organization or community, but never *to* or *on* them. It is a reflective process, but is different from isolated, spontaneous reflection in that it is deliberately and systematically undertaken and generally requires that some form of evidence be presented to support assertions (Herr & Anderson, 2005, p. 3).

This collaborative nature of action research is fundamental this researcher's teaching methods and the research questions. Both student-participants and teacher-researcher were expected to reflect and provide evidence to each other as a routine part of classroom instruction. Herr and Anderson (2005) go on to say that collaboration between those that have a stake in the problem under investigation is desired quality of action research.

Herr and Anderson (2005) speak directly to action research in an educational setting referring to it as a route to professional growth in individuals, groups, and institutions. Herr and Anderson (2005) trace the origins of action research in education to John Dewey's attribution of the importance of the human experience in the generation of knowledge. On the base of Dewey's work Herr and Anderson discuss the refinement and expansion of action research in education. From the idea that we learn from our experiences to further learning through reflection to further learning through collaborative experience, reflection, and planning; action research has become not only an accepted practice in education but often the preferred research method.

Hendricks (2006) offers a comprehensive textbook style exploration of action research and guide for application in educational settings. DuFour, Dufour, Eaker, and Many (2006) offer a how to style perspective, complete with CD, on applying action research through the

use of a small study group called a professional learning community.

Sagor (2000) provides a compelling justification and process for undertaking action research as a form of school improvement. He describes many of the pitfalls encountered in a seven-step action research process and practical ways to address each. Sagor's (2005) work expands and simplifies as he combines both the textbook and how to approaches in his work. Sagor's audience is both the individual teacher seeking personal professional growth and the school teams that guide instructional change. Sagor simplifies the Action Research process into a four-step process that makes taming the unexpected realities of an educational setting and the cyclical nature of action research more palatable. Sagor's (2005) steps are: clarifying the vision, articulating your theory, taking action and collecting data, and reflection that informs your next action. Shagoury Hubbard and Miller Power (1993) speak directly to classroom teachers in their work. The use of analogy to explain basic action research principles and real classroom examples make their work comprehensible to their audience.

As an avenue toward school improvement Reeves (2009) offers an application of action research aimed at school leaders. Reeves tackles such issues as how to create a school climate that will embrace change, how to plan change, implement change, and sustain change. Reeves offers cautions and advise that is practical and from a wide variety of educational settings.

The research questions were explored from many perspectives using qualitative data. Collaborative discussions between the researcher and participants, which are common to action research, were a significant source of qualitative data. Other sources of qualitative data included the observations and analysis of the researcher and student work samples. These sources of data were examined to identify patterns of student thinking that relate to the research questions.

The researcher used Thinking Maps®, Habits of Mind and district curriculum in a four week summer school session (2009). All data collected in the course of this research project was a routine part of the summer educational experience. The researcher sought and received permission from the district to use this data. While working with in the norms of a public school district, and Federal grant specifications, the researcher analyzed the effectiveness of specific routine practices (collaborative discussion, questioning, reflection) and tools (Thinking Maps®).

Student participants were informed of the expectations of the educational environment and those of the researcher at the beginning and throughout the research project. Student participants were informed of and encouraged to participate in the work of the researcher. Student participation in instructional decisions is a routine part of the researcher's instructional strategies and is based in educational constructivist theory (Grennon Brooks & Brooks, 1993; Marzano, 2007; Wiggins & McTighe, 2005; Zelman, Daniels, & Hyde, 2005). Conferences, selection of items for portfolio, and feedback on instructional practices will all offer student participants avenues to participate in data collection (Shagoury Hubbard & Miller Power, 1993) and are routine elements of the researcher's instructional practices that are supported by the district in which the researcher is employed. The involvement of student participants in the data collection increases the validity of the data. Participants had opportunities to clarify the expression of their thinking. The researcher had an opportunity to ask questions to add clarity. This reduced the inferences of the researcher and increased the validity of qualitative evidence. Since the participants were not be rewarded or punished for their responses in the research there was no incentive for participants to provide inaccurate information.

The researcher identified the content data of student work to evaluate and modify critical thinking and strategies used during routine classroom instruction. Comments to participants were positive and inquisitive. The researcher asked questions to solicit more information from students and encouraged them to reflect on their answers. This style of instructional feedback is based on Cognitive Coaching practices (Costa & Garmston, 2002) and current constructivist educational research on effective questioning techniques (Brooks, 1993; Harvey & Goudvis, 2000; Marzano, Pickering, & Pollock, 2001).

Standardized classroom assessments were used to triangulate the qualitative data. Students were given pre and post assessments in reading fluency, reading comprehension, mathematics, and writing. Either district or publisher developed these assessments. The formal assessments were used as a baseline for student performance, to set student goals, and determine progress. The district required these assessments for all summer school students.

Theoretical Framework

Constructivist education offers the best fit for preparing today's students for tomorrow's challenges (Grennon Brooks & Brooks, 1993). Instruction that encourages students to construct meaning for themselves, often referred to as constructivist, increases the likelihood of retention and application of content (Grennon Brooks & Brooks, 1993; Sprenger, 1999). Many teachers spend large amounts of time presenting new information to students and provide little time for students to process, analyze, make connections, and reflect on the content (Grennon Brooks & Brooks, 1993). This researcher builds on the work of Grennon Brooks & Brooks (1993) and offers further evidence to support the constructivist practices of questioning, metacognition, and collaboration as the foundation of a quality classroom.

This researcher was focused and intentional in the use of questioning techniques. Questioning techniques were used to guide students toward self-reflection (Woodruff, 2006). When students ask for answers or judgment of work, the researcher asked the student for justification or explanation of student opinion. "How do you know?" or "What do you think?" were common researcher responses to foster self-reflection in the student. Through self-reflection students made connections, found meaning in the content, built self-confidence, and built a readiness for developing Habits of Mind (Costa and Kallick, 2000, 2008, 2009). These effects of constructivist questioning techniques were hallmarks of student academic success (Grennon Brooks & Brooks, 1993; Marzano, 2007; Wiggins & McTighe, 2005; Zelman, Daniels, & Hyde, 2005).

Costa and Garmston (2002) have combined the Habits of Mind with constructivist questioning to develop Cognitive Coaching. The use of structured conversations, carefully crafted questions, and a non-judgmental stance, is used to intentionally develop each state of mind (clusters of Habits of Mind). Cognitive Coaching is designed for use as a teacher

development and school improvement tool. This researcher used the questioning techniques taught in Cognitive Coaching seminar (Costa and Garmnston, 2007) with questions intentionally crafted to lead students to academic content as the primary means of constructivist instruction. A constructivist teacher or Cognitive Coach begins by Meeting each person where they are and gaining an understanding of their worldview or current understanding of a concept. As a constructivist educator models the concept being studied; the student observes and analyzes the concept. As both a constructivist educator and Cognitive Coach open-ended questions that encourage synthesis of information and the development of personal meaning are carefully crafted. When misconceptions need to be corrected or understanding deepened the constructivist educator returns to more examples or models of the concept and the cyclical nature of teaching begins another loop.

The non-judgmental identification of changes in student thinking was the heart of this research project. Each student was accepted, judged by standardized tests, and expected to self-assess ongoing performance. The researcher took on the role of co-learner and critical friend; exploring student learning experiences with each individual student. This stance is the same stance essential to constructivist teaching and Cognitive Coaching.

Social interaction and collaboration help students make connections and retain academic content (Grennon Brooks & Brooks, 1993; Jensen, 1998). When students are shown one perspective or one right way of doing something they tend to accept and expect one right answer (Woodray, 2006). Students develop a dependency on the teacher to provide the correct way are unlikely to question or think individually (Aukerman, 2006). When students are exposed to a variety of perspectives and expressions of a concept students are more likely to develop their own (Grant & Wiggins, 2005, Grennon Brooks & Brooks, 1993). As students work collaboratively they naturally question each other and seek justification of

ideas. As students ask and answer these questions at their own level of understanding they build a firm foundation from which to reach the next level of understanding (Grant & Wiggins, 2005). The social aspect of collaboration also adds an emotional dimension to the experience (Goleman, 1995, 1998). Adding an emotional connection to the content and task increases the likelihood that key information will be retained in long-term memory and more easily retrieved (Howard, 1994; Jensen, 1998; Sprenger, 1999; Sylwester, 1995, 2000).

Behavior is a key factor in learning (Jensen, 1998; Sprenger, 1999; Sylwester, 1995, 2000). It is common for teachers to say that a struggling student would be so much better off if they would just improve their behavior? If he or she could just sit still long enough to listen to a lesson or complete an assignment, grades would be better. Most individuals would agree that certain behaviors make learning more difficult or even impossible. This researcher is interested in exploring learning behaviors that increase student academic performance (Costa & Kallick, 2000, 2001). There are specific behaviors that increase the likelihood that learning will occur. When these behaviors are not present and practiced learning is unlikely to occur. This researcher wonders, which comes first, the behavior or the academic progress. Are behavior and academic progress more likely to develop simultaneously?

The sixteen Habits of Mind identified by Arthur Costa and Bena Kallick (2000) in their four book series are essential keys to building academic success in a constructivist learning environment. These sixteen thought patterns, known as Habits of Mind, are: persisting, managing impulsivity, listening with understanding, thinking flexibly, thinking about thinking (metacognition), striving for accuracy, questioning and posing problems, applying past knowledge to new situations, thinking and communicating with clarity and precision, gathering data through all senses, creating, imagining, innovating, responding with wonder and awe, taking responsible risks, finding humor, thinking interdependently, and remaining open to

continuous learning (Costa & Kallick, 2000a). A constructivist-learning environment is likely to be designed to foster the development of each Habit of Mind. With a clear understanding of Habits of Mind and constructivism a learning environment that intentionally fosters the development of each Habit of Mind is easily within reach of both student and teacher.

Visually organizing thoughts helps us identify the connections between ideas, clarify our thoughts, and share them with others (Jensen, 1998; Sprenger, 1999). As individuals see their thinking with clarity revision and development of thinking (metacognition) is a natural effect (Costa & Kallick, 2008; Hyerle, 2009). As individuals reflect on their thinking they become better able to articulate their thoughts and justify or explain concepts. Visual organization of information is supported by the research literature on best practice in teaching and an accepted intervention for struggling learners (Harvey & Goudvis, 2000; Marzano, 2003; Marzano, Pickering & Pollock, 2001; Tomlinson, 1999; Tomlinson & McTighe, 2006; Zemelman, Daniels & Hyde, 2005). Visual organization of ideas is particularly helpful for students with language difficulties (Marzano, 2003; Marzano, Pickering & Pollock, 2001). When students are able to use words or symbols to represent the interconnected and nonlinear concepts in academic content, the concepts become clearer. Connections to related ideas are better accessed and used to expand concepts in a meaningful manner. The visual aspect is the preferred manner in which the brain is equipped to receive and process information (Jensen, 1998; Sprenger, 1999; Sylwester, 1995). Understanding and using this predisposition to a student's advantage makes the student's task of learning less challenging.

Limitations and Delimitations

This research project was conducted within the parameters of the Century 21 (C21) Learning Centers established under NCLB legislation and the school district in which the Century 21 Learning Center is operating. Century 21 Learning Centers are funded under NCLB legislation for the purpose of providing educational opportunities outside the school day for: students with limited economic resources, student members of ethnic minorities, and students that score below standard on standardized tests.

In order to meet the requirements of a Century 21 Learning Center grant the district carefully chose schools within the district to locate the program and recruit participants. The chosen schools were comprised of significant populations of student members of minority groups, students living in homes of limited income, and student state standardized test scores that were largely below state and federal expectations. This strategic move maximized the probability of finding and serving the target population and increased the efficiency with which qualified participants were found.

This research project was conducted within the parameters of a summer program conducted by a public school district and Century 21 Learning Centers. Both school district and Century 21 Learning Centers worked together to set the expectations of supervisory staff, administrators, instructors, paraeducators, and students. A convenient sample was used in this research project since the Century 21 Learning Center program determined the participants. Over fifty students were invited to participate in the summer program. Approximately forty students returned their applications and were selected for participation in the summer enrichment program. Approximately half of the students selected for the Century 21 program at this location are exiting fifth grade, assigned to the same classroom, and participated in this research project. Students chosen for the Century 21 Learning Center

program and exiting third or fourth grades will not participate in this research project. Exiting third and fourth graders will be in another classroom and will have some shared experiences with those participating in the research project. Students chosen for the summer program will be primarily from a single elementary school. The primary elementary school was in phase one of school improvement in the 2008-2009 school year and has proceeded to phase two for the 2009-2010 school year. The majority of students that attend this elementary school are living in households that have limited economic resources (60-65% from 2007 to 2009). The number of families free or reduced price lunch and breakfast continues to rise. This elementary school is also comprised of a majority of ethnic minority students. In October 2008 32% of the student population was categorized as white. Included in the white population is a large percentage of students from Eastern European immigrant families: Russia, Ukraine, Turkey).

Students received three hours of teacher directed academic enrichment for sixteen days over four weeks in the summer of 2009. Test scores were the primary means used to determine which students were invited to apply to the summer program. Students performing below grade level based on the previous year's WASL results were targeted for participation by Century 21 Learning Centers as well as below grade level performance confirmed by district trimester assessments in reading, writing, and math. Teachers were then asked to confirm student need through observation and daily assignments.

All participants must have strong parent support in a few specific areas. All parents and students committed to 16 three-hour sessions of academic enrichment during the summer. This meant that the participants and their families arranged family vacations around these sessions. Transportation was provided as part of the program. Both student and parent/guardian also saw a need for academic enrichment and had confidence that the Century 21

Learning Centers program had a high probability of providing needed support for the student. Participants and their parents/guardians were fluent enough in the English language to discuss the logistics of participation. Communication to parents in this program was limited to English due to limited number of staff employed by the grant. Interpreters that are normally available to parents to discuss student academic progress and behavior were not part of this summer program. bi-lingual/bi-cultural school employees routinely provide translation and enculturation during the regular school year. No bi-lingual/bi-cultural employee representing the participating students' language or cultural group was employed as part of the Century 21 Learning Center summer program. The researcher and paraprofessional both have linguistic and cultural background in Japanese. The cultural and linguistic awareness of these two professionals may aid in the development of English Language Acquisition, specifically those speakers of Asian languages. The paraprofessional is half Japanese and maintains long-term relationships with many Japanese citizens through a cultural exchange program. The Researcher was an exchange student in Japan and returned to teach conversational English to children. The researcher also maintains long-term relationships with Japanese citizens.

Family participation in special designated activities is strongly encouraged. One family event was planned in the course of the sixteen-day program. The family event was intended to showcase student work and provide an informal opportunity for parents or guardians to interact with teachers and students. Parents and Guardians are strongly encouraged to attend.

The timeframe for data collection for this research study was four weeks in the summer of 2009. Teacher and Paraeducator training was the morning of June 26, 2009. The afternoon of June 26 teachers and paraeducators met with their administrator to plan the family event and a fieldtrip for the last day of the program. Schedules and other logistics were fit into the

afternoon planning time. The administrators were responsible for two locations and split their time between their two sites. Student contact days are: June 30, July 1, 2, 6, 7, 8, 9, 13, 14, 15, 16, 20, 21, 22, 23, and 24. The student schedule began with academic instruction from 9-noon. Teacher supervised student lunch was from noon to 12:20. The bus began loading at 12:20 and departed at 12:30.

The research project was limited to this single summer data collection so that the dissertation process could be completed in the four-term format. The short period for data collection provided a good base on which to build further research. Areas of further research and more specific research questions were identified in this short timeframe. The three hours of instruction four days a week provided students adequate exposure to and experience with both Habits of Mind and Thinking Maps® to determine initial affects.

Using Thinking Maps® as a reflective tool is the focus of this research study. Other visual tools for organizing information were not considered in this research study. Using Thinking Maps® for initial instruction was not the focus of this study. Initial instruction was presented in a variety of formats consistent with best practices, district directives, student needs, and researcher preferences. This researcher used constructivist theory and practices that are supported by the district in which this research took place as the routine foundation of instructional practice. Data for this research project was confined to student created Thinking Maps® used to express and record student-thinking patterns and content understanding, student test scores, teacher observations, and student portfolio entries.

Student scores on the WASL will not be compared to determine if student academic performance has increased. The WASL scores for academic content addressed in the summer program would be difficult to isolate on a WASL subtest, many other factors

contribute to student scores including regular school year instruction, and scores would not be available for a full year after the conclusion of data collection. The new Superintendent of Public Instruction announced January 21, 2009 that spring 2009 would be the last time that the WASL will be given. The new Superintendent of Public Instruction is overseeing a new state assessment system that will be implemented beginning in the spring of 2010 (Office of the Superintendent of Public Instruction, 2009). Since the WASL is changing it would not offer the comparable student performance data necessary for this research project.

Student scores on district assessments given during the regular school year will not be compared to determine student academic growth. The district assessment scores are not reported to the district and are often reported and recorded within schools in a variety of ways. Administration of district assessments is not closely monitored and therefore is administered in a variety of ways. For these reasons the district assessments administered during the year were not be used.

Standardized assessment measures were confined to pre and post assessments in: reading fluency, reading comprehension test, writing, and mathematics. The researcher administered each of the assessments. Due to the length of the summer program (sixteen days of teacher-student contact) standardized assessments provided little useful data. Sixteen days is not enough time for an average student to make noticeable progress on a summative standardized assessment. Considering that six of the sixteen days were used for student completion of assessments there were ten days of instruction. The results of pre and post tests were mixed and provided an avenue for discovering or confirming qualitative data.

Definitions

Thinking Maps®

Thinking Maps® is a visual language that “integrates the creative dynamism of webs, the analytical structures of content-specific learning, and the continuous cognitive development and reflections fostered through conceptual mapping.... graphics are constructed by individual or collaborative learners ... [and] are also used across cultures and languages and may become keys to new levels of more democratic participation and communication in human systems (Hyerle, 2009).”

Thinking Maps® are grounded on the eight thinking processes of: defining in context, describing qualities, comparing and contrasting, classifying, part to whole relationships, sequencing, cause and effect, and seeing analogies. Each thinking process is connected to and represented by one graphic. Each graphic is flexible and intended to mold to each individual's thinking. As a result two individuals or groups can create a Double Bubble map to show a comparison and contrast of two objects and neither map will be the same. Each map will represent the thinking of the creator/s. This flexibility enables the creator to express their actual thinking. Teachers reviewing student created maps are more easily able to identify the level of understanding and specific areas of confusion for each student. Armed with this information teachers can differentiate instruction to the needs of students quickly and efficiently. Using maps as the source of discussion, students are better able to focus their discussion on content. More content focused discussion leads to an increase in the use of specific vocabulary and a deeper understanding of content.

In addition to a specific flexible graphic for each of the eight thinking processes a metacognitive Frame of Reference can be added to any Thinking Map®. Appearing as a simple box around any Thinking Map® the Frame of Reference is used to identify the factors

that contributed to the construction of the Thinking Map®. The Frame of Reference may reveal point of view, supporting documents, influential people, or a time period among many other reflective insights.

Habits of Mind

Arthur Costa and Bena Kallick define and explore the concept of Habits of Mind in a series of books, *Habits of Mind: A Developmental Series* published in 2000. Intelligent behaviors that led individuals to deeper understanding and critical thinking were identified. The sixteen Habits of Mind are: Persisting, Managing impulsivity, Listening with understanding, Thinking flexibly, thinking about thinking (Metacognition), striving for accuracy, questioning and posing problems, applying past knowledge to new situations, thinking and communicating with clarity and precision, gathering data through all senses, creating, imagining, innovating, responding with wonder and awe, taking responsible risks, finding humor, thinking interdependently, and remaining open to continuous learning (Costa & Kallick, 2000a).

When these intelligent behaviors become routine a Habit of Mind is formed. Each Habit of Mind is distinct and clearly identifiable. The Habits of Mind are also interconnected and often occur in clusters. They are like the ingredients in a recipe for success. We often see certain combinations together but some chefs are rather creative in their combination of ingredients and each chef learns to use the same basic ingredients through different experiences. The Sixteen Habits of Mind are the behaviors that alert us to the presence of the States of Mind.

States of Mind

In their work on Cognitive Coaching™, Arthur Costa and Robert Garmston define five states of mind: craftsmanship, efficacy, flexibility, consciousness, and interdependence (Costa & Garmston, 2002). The States of Mind are the “basic human forces that drive, influence, motivate, and inspire our intellectual capacities, emotional responsiveness, high performance, and productive human action....we know them by their effects....The states of mind inform and make possible the application of strategies and the selection of thinking processes appropriate to a situation. Unlike Cognitive Style, these five states of mind are developmental.” (Costa & Garmston, 2002, p. 124-125). They develop over time and with practice. The Sixteen Habits of Mind are the behaviors that alert us to the presence of the States of Mind. Each State of Mind is characterized by a group of Habits of Mind. While each of the Habits of Mind and States of Mind form an interconnected whole picture of a person, each Habit or State presents a perspective of the individual.

In terms of the recipe analogy, if we combine certain ingredients the result is a specific kind of food. If you combine eggs, ham, bell pepper, and onion you are likely making an omelet or scramble. If you intentionally work to develop your own Habits of Mind: striving for accuracy, persisting, applying past knowledge to new situations, creating, imagining, and innovating with taking responsible risks you are likely developing the state of mind craftsmanship. A person who is driven or motivated to be craftsman like in their thinking also has a high probability of intentionally developing those same Habits of Mind.

Craftsmanship

The healthy desire to constantly improve upon one's accomplishments defines the Habit of Mind, Craftsmanship (Costa & Garmston, 2002, p. 132). "Excellence in performance is the soul of craftsmanship (Costa & Garmston, 2002, p. 133). David Hyerle illustrates this concept with an analogy (Costa & Garmston, 2008, p. 151). Craftspeople or tradesmen such as carpenters and cooks use specially designed tools and methods under the guidance of mentors to move from novice to expert in their field. This is the same when developing the State of Mind, Craftsmanship. The tools and methods are the sixteen Habits of Mind.

An application of the Craftsman analogy might further clarify. I'll stick with the craft of food preparation. Most home cooks rely on a few tried and true menus that use similar tools used in similar ways to prepare meals. Families and individuals venture from this routine when time allows, and to combat boredom. The purpose of cooking in most households is nutrition for the purpose of survival. We eat to live. We do what is necessary to survive and maintain moderate interest.

A person that embraces food preparation as a craft/trade sees food preparation very differently. The same simple tools and ingredients would be used in a wide variety of ways. Meals are events to be savored, explored, immersed in, critiqued, and continually improved upon. In the home of person that sees preparing food as a craft, food is a motivation to live, a rich cornucopia of possibilities begging to be experienced. The desire to create consistently succulent meals becomes almost a compulsion. One truly becomes absorbed in the study of preparing food. In reality, few people ever become so absorbed in perfecting something and yet most of us know someone who comes close. Many of them may have found ways to benefit from their Craftsmanship in an area through employment. Most of us find a moderate degree of Craftsmanship in our work and seek to balance it with other demands on their lives.

We seek Holonomy.

Some Habits of Mind have a closer connection with craftsmanship than others. The Habit of Mind, Striving for accuracy is most clearly connected to the term craftsmanship in Costa and Kallick's book *Learning and leading with Habits of Mind* (2008, p. 25-26). It is defined as a desire to continuously improve, to seek mastery and produce exceptional results efficiently. Other marks of craftsmanship are truthfulness, precision, taking time to check over completed work, and repeatedly confirming that work matches the criteria for the work. The desire to continuously improve is the most obvious hallmark of the State of Mind, craftsmanship and the Habit of Mind, striving for accuracy.

As applied to critical thinking, Craftsmanship is the compulsion that motivates us to think about situations for extended periods of time without prompting. The perfect solution that comes to you in the shower, or the great idea that wakes you up at two in the morning are examples of craftsmanship. The math problem that seems to haunt your thoughts until you have a solution is another example. The pairing of persistence with striving for accuracy is the depth of Craftsmanship that exemplifies the drive of great minds.

Critical Thinking

The behaviors of a critical thinker can be defined as the sixteen Habits of Mind (Costa & Kallick, 2000, 2002, 2008). Just as with the States of Mind, critical thinking is more closely connected to a cluster of Habits of Mind. For the purposes of this study critical thinking is defined as self-analysis and conscious application of concepts. In terms of Habits of Mind, that is Metacognition and applying past knowledge to new situations, which leads to creating, imagining, and innovating.

A holonomous balance of the States of Mind (Costa & Garmston, 2002) is the driving force that develops critical thinking skills. Holonomy is an awareness of the balance between self and other. Holonomy is knowing the self well enough to know how you are different from and like others. Holonomy is knowing when and how the self is connected to others. Holonomy is an awareness of the interdependence of individuals and ideas.

An expectation of critical thinking skills is found throughout the state standards, in all content areas. The ability to make connections between content areas is an indicator of critical thinking, an application of new learning, and a Habit of Mind. Applying knowledge to new situations is also a critical thinking skill required in many employment settings today. Identifying patterns and similarities in and between situations as well as content is the foundation of critical thinking and securing gainful employment.

In order to make these connections and then apply new learning, one must also engage in several Habits of Mind. One begins by Gathering information and staying focused by managing impulsivity. Information is often gathered by listening with understanding and empathy working with others, thinking interdependently. While remaining open to continuous learning one persists in these behaviors, Habits of Mind, and often moves toward thinking flexibly and metacognition. The next behavior often noticed is questioning and posing problems to deepen understanding. One then applies past knowledge to this new learning and begins to communicate with clarity and precision. Which leads to creating new ideas, imagining possibilities and practical innovations that inspire one to respond with wonder and awe. This whole process requires one to take responsible risks and see the humor in otherwise challenging or tense situations. It is through the interwoven practice of these sixteen Habits of Mind that we arrive at the end result of critical thought. While all sixteen Habits of Mind are not necessary, each one enhances the end result.

Indicators of critical thinking include and are not limited to: the use of specific details, accurate analogies, facial expressions, body language, and specific vocabulary.

Visual Organization

The brain is predisposed to receive and process more information visually than through any other sense. Organizing information visually assists the brain to make connections and understand content. Since most concepts are not linear in their development, speech and written word lack the nonlinear structure needed to express many concepts in depth. There are many ways to visually organize information. Pictorial representations, graphic organizers, cognitive webs, and charts are all common ways to organize information visually. These representations enable the creator to express connections to aspects of a concept or to other concepts that are more difficult to express in speech or written word. These visual representations also express the depth and complexity of concepts in a focused, dense, and precise manner. Often many pages of text may be needed to explain a single visual representation.

Reflection

Metacognition is the basis of critical thinking. If one is unaware of one's own thought and action it is quite difficult for that person to alter his or her thought or behavior. It is through reflection that new information is processed and connections to prior learning are made. It is through reflection that concepts are clarified. By taking the time to consider our own thoughts we gain increased understanding and control of our self and the environment in which we live.

It is metacognition that empowers individuals to make focused and intentional decisions.

Individuals that tend to act without considering the impact of decisions often must contend with undesired consequences and struggle to find purpose and direction in life.

Reflection can take several forms. Reflection can be part of group activities such as discussion. Explaining or justifying your thoughts on a subject that the group is discussing is a common form of public reflection. Carefully crafted questions can help a group reflect on a topic together and build interdependent thought. Questions that invite an open-ended and focused exploration of a topic and not an answer to a topic are the most beneficial to group reflection and interdependent thought. Questions like: What do you think? Where have you seen that before? How is that like or different from this? Often begin group reflection and interdependent thought. As individuals share their thoughts they think about their thoughts and the thoughts others share to create further development of the topic. When experienced in a safe and inviting environment this type of reflection can yield rich results.

The same type of experience can be done in two person conversations. Teachers using the workshop model of instruction often use this type of conversation with students in conferences. It can be used instructionally to uncover student thought and reveal the depth of understanding or lack of understanding of a specific concept. It can be used to encourage students to explore a topic further so that misconceptions are corrected or built in greater depth. It also provides an emotional connection, which is a significant factor when increasing motivation and retention of concepts.

Independent or internal reflection is the most common form of metacognition. Many individuals think and monitor their thoughts with little awareness. Many actions and decisions we make require the efficiency of instant decisions with little monitoring of thought. Could you imagine having to think about keeping your heart beating, breathing, blinking your eyes, and

keeping yourself upright, while trying to read this? It is for this reason that we are blissfully unaware of many of our thoughts. This pattern is necessary for survival. When we reach beyond our core mental processes of our reptile brain it becomes more important to be aware of our thought processes. We must be aware of our thoughts in order to share them with others. We must be aware of our thought processes to repeat them consistently. In order to change or improve our environment or ourselves we must have an awareness of our state through reflection. In order to keep a record of individual thought and how it develops journals are particularly helpful. Memory is not always accurate; it is colored by present context and experience. Reading ones own words frozen in time often provides a clearer picture of thought development and increases the depth and accuracy of metacognition.

Mind Brain Connection

For the purpose of this research project the brain refers to physiological aspects of a physical organ. The mind refers to psycho-emotive aspects of the human condition. The connections between the mind and brain refer to how thoughts, emotions, and behavior are influenced by our physical body and it's environment. New connections are being discovered and better understood each day.

Brain research tells us that visual receptors and visual processing make up significantly more of our sensory input and mental activity than any other part or action of our brain. Mind research tells us that we are more likely to remember a person's face than his or her name. When we put the two pieces of information together and explore the connection between mind and brain we begin to see useful patterns. Because a large proportion of our brain is prepared to receive and process visual information it follows that presenting

information in visual formats would aid in the processing of information. It further follows that organizing the information in meaningful visual contexts would aid in understanding and memory.

Emotion is another factor of brain research and psychology. If you can remember a particularly emotional event and not what you had for lunch two weeks ago you have experienced the role emotion plays in your thought. Have you ever listened to someone recount an event with passion and think to yourself, that's not the way I remember it? This is an example of how emotion can impact our perceptions. The connection of emotion and personal relevance of the information presented increase the likelihood the information will be remembered.

Workshop

The workshop model of instruction offers a structure for the pedagogy embodied in this research project. Beginning with scheduling, large blocks of uninterrupted time (90 to 120 min) are set aside for cross-curricular study. Student and teacher use of the blocks of time follows a prescribed set of routines.

Generally the block begins with a ten to fifteen minute whole class interactive lesson, called a mini-lesson. The teacher offers specific instruction and practice in a specific objective. The objective is explicitly connected to student work. Real life application and importance is also part of the mini-lesson.

The class is dismissed to begin work on the day's assignments. Assignments consist of personalized or individual work, as well as group projects. The teacher will use this large block of student work time to complete several activities.

Small groups work with the teacher. Each small group has a specific skill as their

focus. Each group has the undivided attention of the teacher for about ten to fifteen minutes. Checking in with the class as a whole is done during transition periods. The teacher observes student progress. If students are in need of assistance the teacher may offer a question or referral to a resource. Students are expected to think through the new information and make adjustments on their own.

Individual conferences are also held with students during this work time. Individual conferences must be held about once a week and be about five minutes long. A student's personal goals and current work are the focal point of the conferences. Teacher and student collaborate in making a plan for goal attainment. Consideration of student experiences, background knowledge and behavior are essential in this conversation. Teacher and student must have a clear understanding of the student's current perspective and situation in order to create optimal student success. Both student and teacher must be responsive to the needs and preferences of the other.

At times it may be appropriate to use work time to conference with students in small groups based on common experiences or skill sets. This is an efficient way for teachers to gain information and further bonds the students.

The collection of student and instructional data is also done during this time. There are many ways of collecting and sorting student data. Ultimately each teacher must decide what data is relevant and worth taking the time to collect. Each teacher must decide what format/s are most efficient and complete for each situation. In general, data must be collected on individual student performance, class and group instruction, instructional alignment with state standards, and the effectiveness of classroom routines.

Century 21 Community Learning Centers

Defined in section 4201 of NCLB legislation (Department of Ed., 2008) Century 21 Community Learning Centers are organizations that assist students in meeting the state academic standards. Funding for the centers is provided by grant application to individual states. These learning centers provide opportunities for academic enrichment and a broad range of support after regular school hours. Evenings and summers are the common times for Century 21 programs.

Century 21 Community Learning Centers exist in cooperation with recognized existing academic institutions and work to better meet the needs of struggling students within specific organizations. The programs and support offered extends to students and their families. An opportunity for family and community involvement in the academic lives of students is an important part of these centers. The grant requires family activities be part of each program. Applicants for the grants are encouraged to involve businesses and other community organizations in their programs.

Literature Review

Action Research

This researcher explored the topic of action research within an educational setting. Several notable texts have formed the literature base on which this research was conducted. Hendricks (2006) offers a comprehensive textbook style exploration of action research and guide for application in educational settings. DuFour, Dufour, Eaker, and Many (2006) offer a how to style perspective, complete with CD, on applying action research through the use of a small study group called a professional learning community.

Sagor (2000) provides a compelling justification and process for undertaking action research as a form of school improvement. He describes many of the pitfalls encountered in a seven-step action research process and practical ways to address each. Sagor's (2005) work expands and simplifies as he combines both the textbook and how to approaches in his work. Sagor's audience is both the individual teacher seeking personal professional growth and the school teams that guide instructional change. Sagor simplifies the Action Research process into a four-step process that makes taming the unexpected realities of an educational setting and the cyclical nature of action research more palatable. Sagor's (2005) steps are: clarifying the vision, articulating your theory, taking action and collecting data, and reflection that informs your next action. Shagoury Hubbard and Miller Power (1993) speak directly to classroom teachers in their work. The use of analogy to explain basic action research principles and real classroom examples make their work comprehensible to their audience.

As an avenue toward school improvement Reeves (2009) offers an application of action research aimed at school leaders. Reeves tackles such issues as how to create a school climate that will embrace change, how to plan change, implement change, and sustain change. Reeves offers cautions and advise that is practical and from a wide variety of

educational settings.

All of the previously mentioned authors of action research in education texts agree on several foundational premises essential to action research. Creswell (2003), Coghlan and Brannick (2005), and Herr and Anderson (2005), authors of general action research texts also identify the same basic foundation for action research. Action research is based in a real life situation. Bias and influences on the research are not avoided but sought out, identified, analyzed, and embraced. Action research is cyclical. One does not simply ask a question and get an answer. One must ask a question repeatedly in several different moments with a new perspective and data. One responds to the current answer each time. There is no beginning or end to true action research.

The nature of action research is very applicable to the educational setting. Educators do not control many of the variables in their situations. Students come and go from their classrooms and sometimes bring with them a wake of turbulence that must be addressed. It is in the midst of professional expectations and student needs that research must be applicable to have value to a practitioner. It therefore follows that the most appropriate research methods for this setting would be designed for this setting.

One ongoing question in most schools is how to increase student performance. Each school, each team of educators, each teacher, and each administrator ask this question continually. The answer has changed over several years. Sometimes it required a change in the definition of student performance and sometimes in the way in which it is measured. The introduction of Multiple intelligences (Gardner, 1993), mandated standardized testing, and national board certification for teachers are few ways educators have tried to answer that question.

While reviewing the above texts on action research in the educational setting this

researcher wondered what literature led to interest in action research in education. Danielson (2002) offers an introductory text on the application of action research in an educational setting. Danielson offers the insight that everything educators do is a result of what they want, believe, and know. It is interaction and development of these areas through the discussion of student achievement that is offered as a framework for school improvement. The work of Marzano (2003) in *What Works in Schools: Translating Research into Action* has an underlying assumption that action research is the appropriate and accepted research methodology for educational settings. It's focus on applying action research results in educational settings is thoughtful and a further example of action research. Again once an action researcher has an answer to a research question, the action researcher asks the question again and considers the new information. Based on the new information in relationship to the research questions; the next cycle of the research begins. This cyclical, practical, and context specific nature of action research is highly desirable in an educational setting.

NCLB legislation passed in 2002 requires the use of researched methods and strategies to be used by teachers. This reauthorization of The Elementary and Secondary Education Act is the first time that specific instructional methods have been mandated by federal law. The focus on methods that have been proven to be successful with students is also relatively new to education. It marks a shift in education; the shift from teacher as keeper and dispenser of knowledge to the student as constructor of meaning. It is this researcher's opinion that this shift toward applied research in education is the current single most influential push toward developing research of any kind and action research in particular in the educational setting.

Critical Thinking

An implied and difficult to measure outcome of education is critical thinking. The ability of an individual to assess a situation and choose an appropriate response is a simplistic explanation of thought. It implies an iceberg of aspects and applications. What constitutes critical thinking and how can it be measured? For the purposes of this research project the work of researchers Arthur Costa and Bena Kallick will be targeted due to its focus on thought development and an educator's influence on the development of critical thinking. Costa and Kallick's work on the Habits of Mind: A developmental series (2000a, 2000b, 2000c, 2000d) defines and focuses much of their work. Costa and Kallick define sixteen behaviors of thought that define a critical thinker. These 16 Habits of Mind are: persisting, managing impulsivity, listening with understanding and empathy, thinking flexibly, Metacognition, striving for accuracy, questioning and posing problems, applying past knowledge to new situations, thinking and communicating with clarity and precision, gathering data through all senses, creating/ imagining/ innovating, responding with wonderment and awe, taking responsible risks, finding humor, thinking interdependently, and remaining open to continuous learning. These intelligent behaviors, or Habits of Mind, are a good perspective from which to begin exploring critical thought.

The terms used to describe the sixteen Habits of Mind are familiar to most individuals. Most people have not given much thought to these common behaviors or how developing one of these Habits of Mind in one situation might impact a person in other ways. Here is an example. A student continually blurts out comments in class. The teacher and student set out to modify this behavior to one that is more classroom appropriate. The student is instructed to raise his hand and wait until recognized before sharing his thoughts aloud. A variety of reminders are used by teacher and student to reduce the student's blurt outs. After some

time, the teacher notices that the student is rarely blurting out. When the student does blurt out he immediately notices his behavior, covers his mouth, and apologizes. The teacher also notices that when the student is in small group conversation, he interrupts his peers less and no longer talks over them. When reading his latest writing assignment the teacher notices that it is significantly longer and for the first time each paragraph has only one topic. While bringing in the class from recess the teacher notices the student helps another student quickly return playground equipment and line up. While waiting in line the student silently reminds another student of expected behavior in line. While this does not happen quickly, clearly, and with every student, changing behavior in one area of life often spills into other areas. It is this infiltration combined with automatic and frequent behavior patterns that we can say with certainty that a habit has been formed.

Habits of Mind have been referred to as intelligent thought, intellectual behaviors, and habits of thinking. Our patterns of thought have profound influence on our behavior. They form the core of our personality. Malcom Gladwell presents an interesting perspective on the topic of how our thoughts and behavior interact in his book, *Blink*. He speaks of how every action we make is connected to previous experience. Each experience builds a foundation on which perception, and behavior are laid. Gladwell takes his theory further and states that if one wants to change their behavior or perception one should intentionally find ways to experience their desired perception or behavior. Perceptions of ethnic groups are a great example of this premise. One may have few dealings with a specific ethnic group and seen pictures of this ethnic group fighting. The person would be uneasy as the images of members of this ethnic group fighting ran through his/her head. After having many positive interactions with members of this ethnic group those early perceptions fade and are replaced with more recent experiences.

The Habits of Mind: A developmental series (2000) establishes clear links between the Habits of Mind, craftsmanship, and critical thinking. This researcher contends that critical thinking is a collection of habits of thought used as tools and applied to a situation or topic. Just as a carpenter uses a collection of tools in specific ways to create great works so to does the critical thinker. The tools of the critical thinker include the Habits of Mind and are generally expressed through refined linguistic skills. One strategy of the critical thinker is to pair Habits of Mind with visual tools.

In contrast to this researcher's perspective of critical thinking are the state objectives. Specific compartmentalized objectives contain elements of what this researcher has defined as critical thinking. Specific thinking patterns such as compare and contrast, explain, describe, and apply are common in state learning objectives. When taken by themselves, they can easily be turned into a list of independent tasks to complete. When the student sees the larger pattern in these specific verbs learning suddenly begins to make sense. As students realize that comparing and contrasting is the same thought process in all content areas it becomes a bit easier. When students are encouraged, even expected, to draw from cross-curricular experiences they create meaning, which is rich and clear. When students draw the connection that these discrete skills are part of larger behavior patterns of success, they find more meaning and motivation.

The refinement or development of linguistic skills is a marker of critical thinking and can be done in several ways. This research is based on the use of Cognitive Coaching™ combined with Thinking Maps® to develop linguistic skills and metacognition simultaneously. Cognitive Coaching™ provides the learner with a focused support for exploring concepts and the self. Thinking Maps® provides a language for expressing and analyzing thought

structures. Equipping teachers and students with these two tools supports a coherent constructivist philosophy that is centered on student learning.

Brain Research

The medical profession has made discoveries that are particularly helpful to educators. An understanding of the architecture and operation of the brain is a good place to start. Sylwester (1995) translates this information for use by educators. Sylwester describes the brain as a pattern-seeking device. It uses chemicals and electrical impulses to physically change itself. The process begins by receiving this electrical or chemical input from various sense organs through the nervous system. Through the use of medical technology such as electroencephalography, magnetic resonance imaging, and computerized axial tomography we can watch the brain as it works and have a record of its behavior. We have learned that the brainstem and cerebellum are the core of the brain and control the automatic movements and responses of an individual; our survival instinct. This is sometimes called the lizard brain because it comprises all of a lizard's brain. When we act with a fight or flight response, it is this area of the brain that is in control. The area surrounding survival central is the limbic system, which manages our emotion. At times when we act with intense emotion it is often this area of the brain that is in control. The largest area of the brain and the area closest to our skull is the cortex. It is the seat of our wisdom and logic. When we reason through a situation and debate the consequences of each action we might choose it is this area of the brain that is in control. It is also the cortex that sets us apart from other species. No other species has a cortex as developed as humans.

When an electrically encoded message reaches the brain it causes a series of chemical reactions, which either cause parts of the brain to become active and build. The

parts of the brain that respond depend on what the message is and its needed response. This process is important to the educator, as it is central to the understanding of memory. “

Limitations make sense. Our brain couldn't possibly process all the information the surrounding molecules and vibrations carry (Sylwester, 1995, p. 57).” The brain receives information and immediately tries to determine if it is part of an established pattern. If the brain does not identify a pattern, it dumps the information immediately. If it does identify a pattern it activates the matching parts of the brain. If further patterns are not detected it dumps the information. If further patterns are detected it continues building connections and patterns. When certain areas of the brain are well connected and contain multiple connections we see knowledge and memory. If the connections are left inactivated they begin to deteriorate. This simplistic summary of memory development from Sylwester (1995, 2000), Sprenger (1999), Jensen (1998), and Howard (1994) laid a basic foundation for the work of educators. Jensen (1998) adds to this understanding of how the brain processes and retains or dumps input. Jensen refers to the brain as a meaning-seeking device. If the brain does not see meaning or value in the patterns it identifies it dumps the input. The more ways an individual can receive input and make meaning of it, the more likely it is that the individual will be able to retrieve the information when needed. The variety of access points and multiple connections to other meaningful concepts make identification and retrieval easier.

Attention is another important area to consider as instruction and learning are planned. Our level of attention fluctuates in 90-minute cycles (Sylwester, 1995, pg. 44). Jensen (1998) states that within these 90 minute cycles, high levels of attention can only be sustained for about ten minutes. With this in mind a teacher must ensure that students are given the freedom to change something about their environment, perspective, or task every ten minutes. It is also important to remember that the 90-minute cycle will not begin and end for

every student at the same time. While a teacher can influence this cycle it is ultimate the student that makes the determination. Particular attention should be paid to the length of whole class activities. Important instruction and directions and other important teacher talk should limited to ten minutes or less.

In planning instruction, it is also crucial to ensure that students attend to content being presented.

“It is biologically impossible to learn something if we are not attending to it, and we do not attend to things that are not emotionally meaningful to us. Educators have always intuitively known this, and yet some teachers continue to speed through this key initial process with a single dreary directive (e.g., “Clear your desk, take out your math book, and work on the problems on page 23”) (Sylwester, 2000, p24)”.

The teacher applies this knowledge by presenting situations to students that have relevance to their lives outside the classroom. Making connections to real life problems and situations that a student is likely to encounter is a good way to do this.

“It isn’t enough for students to be in a stimulating environment- they have to help create it and directly interact with it. They have to have many opportunities to tell their stories, not just listen to the teacher’s stories. (Sylwester, 1995, p. 131)” Sprenger (1999) offers the same admonition to teachers.

Jensen (1998, p. 35-36) says,

“The single best way to grow a better brain is through problem solving. This creates new dendritic connections that allow us to make even more connections.... Surprisingly, it doesn’t matter to the brain whether it ever comes up with an answer. The neural growth happens because of the process, not the

solution.”

Engaging students in the construction of their environment and the consequences of their choices is a common way in which educators meet this challenge. Again realistic situations from life outside the classroom should provide the context through which academic standards are explored.

Sprenger (1999) states that researchers are finding correlations between Piaget’s developmental stages and the stages of myelin release and brain growth. Of interest to this research project is the connection between Piaget’s formal operational stage occurring between eleven and fifteen years of age and the last stage of myelin coating occurring in the brain at the same time. Sprenger notes the connection to higher-order thinking that occurs at this time. She offers that the lack of a student’s ability to perform higher-order thinking (synthesize, abstract, evaluate...) may be due to a lack of myelin coating the axons in the brain and may account for the developmental differences between individuals. As an educator this means that opportunities to access academic content cannot be a one shot deal. Students need multiple opportunities over several years to increase their chances of being biologically ready for constructing and applying meaning.

Another reason many students do not meet academic standards is their lack of understanding of the intent of the school experience. Sylwester has a rather interesting take on this topic.

“A school functions somewhat like daytime sleeping and dreaming. Recall that six hours (75 percent) of our nighttime focuses on the creation and editing of memory networks, and two hours (25 percent) involves dream periods in which the networks, are randomly activated and organized into dream stories. This set-up sounds a lot like school. Teachers tend focus more of their time and energy

on teaching new information (i.e., creating memory networks) and less on using that knowledge in such social problem situations as discussions, games, simulations, role playing, storytelling, music, and art (i.e., circuit testing).

Further, students tend to view school as a somewhat surreal, random, dreamlike experience. Spelling follows arithmetic or vice versa; the teacher suddenly lashes out at a student; someone throws up; it's time for library; it's anyone's guess whose hand will go up when the teacher asks a question, or even what question will be asked... (Sylwester, 1995, p. 102)."

As an educator this researcher was heavily influenced by this insight and saw renewed value in cross discipline thematic instruction and well as intentionally taking building in time to make explicit connections between situations outside the classroom and the content standards studied. When a student blurted out comments. This is stupid! Why do we have to know this? And, When will I ever need to know this? This teacher stopped everything and answered the question directly. Often inviting other students to join in answering the question created increased interest in the academic content. Explicitly making connections to real life situations helped teacher and students build a meaningful construct of seemingly disconnected ideas.

As an educator this researcher wondered why some students seemed to give up and not bother trying or rely on others, including the teacher, to complete their work for them. Jensen offers some insight into this phenomenon. Jensen (1998, p. 58-59) shares the results of several studies on learned helplessness. When exposed to a negative stimuli or situation in which the subject had no control; the subjects responded with resignation, anxiety, anger, depression, and restlessness. In humans the results involved responses that combined several of the responses. The researchers went on to see what it took to counteract this

experience. In dogs, it took 30 to 50 experiences where the dog could choose to avoid the negative stimulus, and shown where to go to avoid the negative stimulus before it would choose to do so. In schools we see this as the I don't care or I won't attitudes of many teens. It is by being placed in situations in which they have not the skills or support needed to succeed as an individual or member of a group that they have learned that school is a place in which they shouldn't even bother to try. Sobering news, and to this researcher, a horrifying reality of many students she works with. To this researcher the question now becomes how to ensure students have control over meaningful parts of their environment and the skills necessary to complete tasks with moderate effort.

Jensen has some suggestions in this area. The first is to reduce the threat of failure. Incomplete or incorrect work must be seen as a building block and not a negative event that will color the student's permanent academic record. Second, setting and monitoring meaningful goals. These goals should be set collaborative with the student and include more student than teacher input. Third, affirm the student as an individual. The student must truly believe that they are capable of learning. Fourth, intentionally help students manage their emotions. Emotions are not bad, they are strong messages from within that offer important insights. Finally feedback, students need a high degree and quantity of meaningful feedback. It is helpful if the student can choose when feedback is requested and offered. The use of ritual and routine in the classroom can do much to make Jensen's suggestions for engaging students a manageable reality in the classroom.

Lesson Objectives

This teacher researcher was trained to write lesson plans using the Madeline Hunter method. Hunter's direct instruction model (Allen, September 1998) provided a base from

which this teacher-researcher planned the classroom activities. Instructional objectives were written on the board each day for students to see and referred to several times by teacher-researcher and students. Objectives contained clear measurable outcomes and were written in content specific and student friendly language. The state standards, use of Habits of Mind and Thinking Maps®, available/required curriculum, student interest, and student skills were considered as the teacher-researcher wrote the daily learning objectives. Opportunities for students to practice the learning objective and scaffolded support to ensure student success were offered as the Madeline Hunter style lesson plan was adapted to the workshop environment. Through conferences, reflection prompts in journals, discussion in small groups, and short whole class sharing closure and cross content applications were explored as part of the lesson plan and workshop model environment. The clear and explicit objectives in understandable language were the foundation on which each day of class was based.

Anderson and Krathwohl (2001) have edited a revision of Bloom's taxonomy of educational objectives. The taxonomy of educational objectives, commonly known as Bloom's Taxonomy, is solely based in one liner path that defines types of thinking from basic to more complex (knowledge, comprehension, application, analysis, synthesis, and evaluation). The revised taxonomy defines two ways of viewing an objective or thought. The revised taxonomy defines thought as a two-dimensional construct of both knowledge and cognitive dimensions.

The knowledge dimension is comprised of four elements. Factual – The basic things you must know before you can solve a problem. (vocabulary, symbols, parts...). Conceptual – How things work together and why. (categorizing, formulas, game rules...). Procedural – How to do something. (routines, science experiments, solving math problems...). Metacognitive – Being aware of the thinking that happens. (making a plan, identifying what is missing in a

group project, finding mistakes in your work...). Each of these dimensions can be experienced at six different levels. The first level is to remember or retrieve information from long term memory. We use this level when we recognize or retrieve information or routines. In level two we Understand or construct meaning. We use this level when we interpret, classify, summarize, infer, compare, identify relationships, or give examples. In level three we apply a concept in context or carry out a procedure in an appropriate situation. We use level three processes when we execute or implement. This is particularly common in mathematics and science. In level four we analyze or break information into parts to determine their relationships to the overall structure and purpose. We use level four cognitive process when we organize, attribute, distinguish relevant from irrelevant information, determine points of view, or consider the context of what we are studying. In Level five we evaluate or make judgments based on a criteria or standard. We use level five cognitive processes when we compare our work to a rubric, critique a product, identify inconsistencies, recognize effectiveness, or detect the appropriateness of a procedure in a situation. In level six cognitive processes, we create. We put parts together in a new pattern or structure that is unique and often intended to be improved in some way. When we create we generate, design, construct, or invent.

This two dimensional view of educational objectives looks at thought as having two elements: information and process. This researcher finds this perspective to quite useful in explaining what often occurs in her classroom and herself. By determining the type of information in the objective and then how the information is to be processed a clearer objective can be written and more meaningful evaluation of student performance can be offered.

Often in mathematics classes students are expected to memorize formulas and apply

them repeatedly to artificial situations. This keeps student thought in one cell/area of the taxonomy; factual knowledge – remembered. It does little to build a more comprehensive application of the factual knowledge. Students would have a greater understanding of the factual knowledge if they were also required to regularly demonstrate the other cognitive processes in connection with the factual knowledge. If a student were to demonstrate with manipulatives the meaning of “ $4n+3$ ” and apply this formula to other geometric shapes while analyzing the work of other students their experience would offer more opportunity for making that knowledge meaningful and useful. The opposite is also true. If a student is required to remember the fact that “ $4+7=11$ ” and expected to demonstrate the concept of addition through a procedure with symbols or manipulatives while discussing their thought process; the experience opens more opportunities for a rich learning experience in which the student gains useful meaning.

Visual Predisposition

Our brain is hardwired to receive the majority of its information through visual modes “The site of 70 percent of our body’s sensory receptors, our eyes (Sylwester, 1995, p. 61)” . The use of visual tools takes advantage of the natural systems of our body. When we organize information in forms that are similar to our brain’s natural organization system it becomes more likely that we will be able to make meaning from the information. “Graphic organizers can help students retain semantic information.... I call these devices “power pictures” because they paint such powerful images in your mind (Sprenger, 1999, p. 65).” Visual tools can be used as a powerful tool to bridge the chasm between personal thought and linguistic expression. This researcher has chosen Thinking Maps® as the visual tools for this research project.

Thinking Maps® are by definition a visual representation of a specific thinking process (Hyerle, 1996, 2004, 2009). This provides a clear focus on the thinking involved in any situation in which they are used. It is for this reason that they are the choice of this researcher. Other visual tools such as graphic organizers, charts, tables and graphs are generally specific to a particular topic or situation. Thinking Maps® offer cross content application since they are first displays of thought and secondarily displays of content or topic. Other visual tools are just the opposite. The basic structure of each of the eight Thinking Maps® is simple. Because of the simplicity of the structure, they are easy to use and remember. Since they are based on thought patterns and not on topic they are not limited to the level of complexity. Thinking Maps® can just as easily be used to display simple thoughts as the highly complex.

John Dewey

The philosophy of education developed by John Dewey has become the foundation upon which this researcher builds her pedagogy. Dewey offers a cohesive perspective in which to frame the constructivist stance in this research. *Democracy in Education* was first published in 1916 and offers a detailed description of the importance of first hand experiences to the learner. Learning is discovery; not storing what others pour into you. It is the hands-on manipulation of concepts that engages the brain and leads the learner to create personal meaning.

Dewey (1916, 1944, p 139) states that activity is not experience. Experience in educational terms involves identified change and the consequences of that change. When a learner discovers that their action has an effect, learning has occurred. When the learner discovers that he or she can intentionally initiate the desired change, learning is relevant and

personal.

To “learn from experience” is to make a backward and forward connection between what we do to things and what we enjoy or suffer from things in consequence. Under such conditions, doing becomes trying; an experiment with the world to find out what it is like; the undergoing becomes instruction-discovery of the connection of things (Dewey, 1916, 1944, p 140).

Dewey contends (1916, 1944, p 141) that the primary source of discipline problems in schools is that schools are designed to mass-produce a product. As such teachers must spend the majority of their time suppressing natural behavior instead of directing it toward learning. The separation of things from their relationships has created a compartmentalized and disconnected experience for the student. Schools would do well to increase the bodily engagement of student with real things that stimulate a learner’s natural curiosity. Education must include the real world application of concepts and pique the interest of each individual student. This researcher agrees that this problem existed in early to mid 1900’s and further contends that it is currently compounded.

Dewey (1916, 1944, p 150) goes on to define thinking and reflection as experience. He offers several features of a reflexive experience. A reflective experience according to Dewey is one in which a person is perplexed, and confused. There must be an element of doubt due to the awareness that he or she does not have full knowledge of the situation. One must conjecture and anticipate consequences of actions. After a careful review of these thoughts one is then able to make a tentative hypothesis and determine a course of action. It is the extent and accuracy of the conjecture and plan that defines this experience as reflexive and not merely trial and error and “make thinking itself into an experience” (1916, 1944, p 150).

Dewey (1916, 1944, p 152) also states that there must be a clear connection between

the thinking, the skill, and a practical application. It is this interconnected relationship that gives the learner purpose for learning and remembering. This researcher contends that Dewey reveals the Achilles heel of today's educational system. "The fallacy consists in supposing that we can begin with ready made subject matter of arithmetic, or geography, or whatever, irrespective of some direct personal experience of a situation. (Dewey, 1916, 1944, p 153)" Learners must experience a real world first hand practical application of content in order to develop a framework for understanding. Without a framework on which to organize the concepts being studied and to analyze their relationships the learner is left to isolate content. Content isolated into irrelevant packages is quickly forgotten.

Dewey (1916, 1944, p 155) proposes that the appropriate educational experience to promote understanding is a genuine problem. Students must be presented with naturally occurring situations that are encountered outside the classroom. The situation must be interesting to the student, multifaceted, and novel. Value in exploring the situation must be readily seen by the student. In order to explore the situation the student must use a variety of academic skills. Reading, writing, observation, collection and evaluation of data, and metacognition should be essential to resolving each situation. Resolutions to each situation should not be able to be copied from others. Resolutions should have the same elements as a genuine problem.

"The processes of instruction are unified in the degree in which they center in the production of good habits of thinking.... The important thing is that thinking is the method of an educative experience. The essentials of method are therefore identical with the essentials of reflection (Dewey 1916, 1944, p 163)."

These sage words bring full circle the relationships between thought, experience, instruction, and learning. This is the bedrock on which modern constructivist practices are founded.

Effective teaching methods consist of real world experiences, the analysis of real world experiences, metacognition, and the intentional development of thinking habits. The development of thinking habits in the context of Dewey's work was defined as skills and resources a student uses to discover make meaning from a genuine problem.

Constructivism

Grennon Brooks and Brooks (1993) place the work of John Dewey in a more modern context. They define the job of a teacher to be to "invite students to experience the world's richness, empower them to ask their own questions and seek their own answers, and challenge them to understand the world's complexities (Grennon Brooks & Brooks, 1993)." Valuing student experiences and points of view is foundation of their philosophy of education. Teachers must understand and respect where individual students are before teacher and student can move forward. Teachers must create experiences for each student that are meaningful (Chiarelott, 2006) and address each student's personal goals. One challenge this presents for a teacher is helping students see that while their ultimate goals might be quite different, the skills and steps toward those goals often quite similar. When the teacher focuses on short term goals and skills with the class and individual application on personal level students are provided with a sense of community and personal motivation.

"Traditionally, learning has been thought to be a "mimetic" activity, a process that involves repeating, or miming, newly presented information (Jackson 1986) in reports or on quizzes and tests (Grennon Brooks & Brooks, 1993)." Constructivist practices focus on helping learners internalize, reshape and transform new information into meaningful concepts. This shift in thinking requires a shift in practice. Teachers in traditional classrooms (Grennon Brooks & Brooks, 1993) generally adhere to a strict textbook orientated curriculum

and seek “correct” answers from students in independent work. In a constructivist classroom (Grennon Brooks & Brooks, 1993) curriculum focuses on big concepts and interconnectedness of the concepts. Students are expected to grapple with concepts and conflicting ideas together to develop their own point of view. Chiarelott (2006) echoes this same point of view.

One application of constructivist pedagogy is Understanding by Design (Wiggins & McTighe, 1998, 2005). Wiggins and McTighe refer to this method of designing units of study as “backwards design”. Teachers begin with the end goal in mind. The end goal is referred to as an enduring understanding. It is the big idea from which specific grade and content learning objectives are based. Then how students will demonstrate their understanding is identified. When these expectations are in place the planning of instructional activities begins and must align with the learning objectives as well as the mode of student expression of those objectives. Beginning with the end in mind ensures that the unit has continuity and increases opportunities for learners to build concepts instead of compartmentalize each experience.

Each Understanding by Design unit is grounded in real world value. Content objectives must be worth knowing this information as an adult outside the classroom. Learning to read and write are basic skills that benefit proficient adults. Adults not proficient in reading and writing are at a significant disadvantage. This makes the teaching of reading and writing worthy objectives within a unit.

Units are based on a theme, generally science or social studies. Within the context of a science or social studies theme reading, writing and math find real world application. Students understand why it is important to know how to read, write, and understand mathematics because they use them just as they will as adults. Projects and activities are developed in a

manner that naturally brings out cross-curricular connections. Research is an opportunity to intentionally teach nonfiction-reading skills. Incorporating data, graphing, and cartography into the research and presentation; Mathematics becomes part of the project. A well-designed unit contains seamless integration of several content areas (Wiggins & McTighe, 1998, 2005). It gives learners ample opportunities to practice and demonstrate proficiency in multiple content standards in each content area that is integrated into the unit.

The reality of today's classroom is that they are filled with unique individuals with unique skill levels, growth patterns, and interests. Teachers teach students, they don't mold a mass of objects. As a classroom teacher this researcher wondered how to manage personalized instruction of a large group. Understanding by Design enabled a more effective use of instructional time. Students could be engaged in several content areas at the same time. Progress on several learning objectives could be supported at once. Understanding by design also enabled multiple ways for students to access the content and express their understanding. This was the beginning of differentiation.

While students were working the need for supporting individual students in different ways became blatant. Through observation and analysis of student progress during work time the teacher identifies specific student skills and challenges. Immediate adjustments can be made to increase student success. The use of rubrics/scoring guides as detailed in Understanding by Design gave direction to students and enabled them to identify the areas in which they needed assistance. Students and teacher set goals together and developed a plan to achieve those goals.

Workshop Model of Instruction

Fountas and Pinnell (1996, 2001) provide a detailed description and practical

application their texts designed for elementary teachers. Tips for managing the environment, activities, and data of the workshop are found in each chapter in both texts. Fountas and Pinnell (1996, 2001) define the literacy workshop within a three block format. The first block is a 30-60 min. study of language and word structure. Students interact with the language and teacher to gain an understanding of the structure of words and language. The second block is 60 min. focused on reading. The primary activity during this time is reading. Students read independently, with partners, and in groups. Students are expected to share what they read and the strategies they used while reading. Literature is analyzed and used to further individual thinking. The third block is 60 min. focused on writing. Students write independently, with partners, and in groups. Students are encouraged to “try on” what they have seen in the work of favorite authors.

Learning in the content areas is woven throughout all three blocks of the framework.... Continuously increase their knowledge through experience, discussion, and reading in multiple genres, and they organize and communicate their knowledge through a variety of presentational formats (Fountas & Pinnell, 2001, pg 13).

Through the integration of content with literacy skills students are given a purpose for developing their literacy skills. The framework allows for a flexible structure that encourages student independence and ownership of personal learning. The teacher is encouraged to develop a student focused perspective through individual conferencing with students and guiding small skill focused groups. The end of each block is a five to eight minute group reflection and planning for the next day.

The primary grade focused text (Fountas & Pinnell, 1996) offers more detailed descriptions and examples of the different types of reading and writing done in a workshop:

independent, guided, shared, and aloud. More descriptions of how to scaffold support for students are also offered in the primary focused text as well. Both texts encourage the use of collaboratively created living charts as a primary tool in instruction and management.

Calkins (2001) offers similar frameworks for structuring the workshop. She advocates the use of books read aloud to the class as a scaffolded support for science and social studies content. Calkins offers leveled booklists and tips for developing collaborative rubrics with the class.

When students identify similar needs, the teacher groups these students to offer both additional and different support. Several management techniques are suggested (Tomlinson, 1999). Heterogeneous grouping of small groups is the most common recommendation. Students with differing skills can assist each other. Pairing students that have significant limitations with a student able to meet expectations is another common recommendation. Forming need-based groups that are guided by a teacher is another recommendation. In most classrooms, this researcher contends that a combination of all three groupings is needed. The teacher must know the students well enough to determine which setting will have the greatest likelihood of promoting student success (Tomlinson & McTighe, 2006). Factors such as the student perceptions of each grouping and willingness to engage are critical factors to consider.

Individual and small group conferences are a vital part of the workshop model of instruction. The goal of conferences is to bring student performance to the forefront of the learning experience. Analyzing student work to determine progress made and the next steps toward student goals is the primary conference activity. The teacher should collect anecdotal notes and student work samples during the conference. These notes can be used for instructional planning, conferences with parents, future conferences with the student, and as

evidence of student skill.

During a conference the teacher's goal is to gain information about the student. That being said; the student should be the one doing most of the talking and demonstrating. Using carefully crafted questions is an effective way to encourage students to reveal their understanding. Cognitive Coaching (Costa & Garmnston, 2002) offers a clear structure that can be used in this context. The use of open-ended and nonjudgmental questions is most readily applied. A simple invitation to "Tell me about your assignment?" can yield a rich discussion about the student and the educational environment.

There are challenges in applying Cognitive Coaching (Costa & Garmnston, 2002) to the classroom. The time necessary to carefully construct and deliver a series of questions that will lead a student to discover concepts for themselves is considerably more than if the teacher merely informs the student. It is also much easier to tell a student the correct answer than to help them discover it for themselves. Asking questions that contain a presupposition that the learner is knowledgeable and able to independently develop understanding is not an easy task. The tendency of teachers is to ask questions only when a misconception is noticed. This gives students the message that if the teacher asks you something, you are wrong. It is important to analyze all student thinking and help students evaluate its worth for themselves. After all, teacher will not always be looking over their shoulder.

To manage the use of Cognitive Coaching (Costa & Garmnston, 2002) this researcher began with the realization that she can't do it all at once. Choosing particular skills, setting them as goals, and following a schedule was particularly helpful. Student conferences were limited to five minutes in duration. Conferences were scheduled so that each student was seen twice a week. Intentionally practicing and teaching the students to practice specific questioning skills laid clear expectations. With the focus and expectations set, students and

teacher supported each other in an interdependent learning environment.

In the classroom philosophy meets reality. Students come to the classroom with their own sets of expectations and experiences. It is the charge of each educator to build on what the student possesses; to foster positive growth (Tomlinson & McTighe, 2006; Marzano, 2007; Zemelman, Daniels, & Hyde, 2005). Within a classroom of 25-30 elementary students teachers must create an environment that addresses the needs of a diverse population; an environment where poverty, culture, and ethnicity are readily confronted. Learning styles and multiple intelligences as well as individual background should be common topics of conversation in the classroom. The richness of individual differences should be celebrated in ways that build community. We should become a community of individuals that are interested in one another and care for each other. We must remember not to treat our differences as we would animals at a zoo on display. We must treat them as we do a new jacket. We are grateful for it, we see a need for it, we get to know it and let it have a direct effect on our lives. Our interdependence should be just as important as our independence. The integration of curriculum through Understanding by Design combined with the structure of a workshop model of instruction makes this possible. Teachers and students are given a variety of situations in which to dig beyond the surface and discover deeper content and relationships.

The use of self-reflection and self-management also fosters critical thinking (Costa & Garmnston, 2002; Tomlinson & McTighe, 2006; Marzano, 2007; Zemelman, Daniels, & Hyde, 2005). The open invitations to explore and articulate personal thought processes give it clarity and direction. When done routinely, students began to ask and answer these same questions of themselves as well as their classmates. Students begin to prepare for the exploration of their thinking and even look forward to it.

Thinking Maps are a visual representation of both the thought process and the content

(Hyerle & Williams, 2009). They are a common and specific language that focuses thought into clear easy to understand structures. With clearly organized thought discussion and analysis of thinking can be focused and specific.

Serafin (2006) offers a detailed plan for implementing the literacy workshop in the middleschool grades. In her text she speaks to the underlying objective of workshop as teaching students to think. She defines five critical dispositions of a good reader(Serafin, 2006).

1. Reading is a process of making meaning of a text.
2. Readers are responsible for choosing and understanding text.
3. Readers are aware of their thinking (metacognition).
4. Readers recognize confusion.
5. Readers apply a variety of strategies when meaning breaks down.

Serafin (2006) states that students must talk in order to generate, articulate, negotiate and revise meaning. She builds explicit models for teaching these talking behaviors into the lessons shared in this text. Santman (2005) adds to this concept by analyzing the thought processes involved in reading. Santman states that imagination is the key to understanding. It is through the use of reflection to express and develop imagination in a focused or disciplined manner that understanding is achieved.

Research Design

Participants

Students completing grade five were selected from a single elementary school were the focus of this study. The elementary school is located in a large suburban district. The elementary school has not met the requirements for adequate yearly progress based on No Child Left Behind for two consecutive years and was in phase one school improvement during the 2008-2009 school year (OSPI, 2008). The student population in October 2007 was slightly over 34% white, 17% Hispanic, 17% Asian, and 15% Black (OSPI, 2008). In May of 2008 66% of the student population at this school qualified for free or reduced price lunches. At least 35% of the student population qualified for English Language services in May of 2008 (OSPI, 2008). Based on this information it was likely that the student sample would be comprised of several ethnic and cultural groups and many of the students would come from families with limited income. The 2009-2010 school year brings phase two of school improvement as mandated by NCLB legislation. The school experiences a continued increase in ethnic minority enrolment, low-income families, as well as a greater need for English Language and special education services in the 2009-2010 school year.

Selection of Subjects

A convenience sample from the student population was selected for the research project. This research project was conducted as part of a summer experience funded and managed by Century 21 Learning Centers. Therefore, all subjects were participants in the Century 21 Learning Center summer program. The Century 21 Learning Center Program is defined in NCLB legislation (Department of Ed., 2008) as academic enrichment outside the school day for students who are performing below grade level standards or have limited

access to educational experiences due to low economic status. Ethnic minority students are given priority placement in Century 21 Learning Center Programs.

Forty students were selected to apply for the summer program from the current fifth grade classrooms and another 30 from third and fourth grade, based on standardized test scores, classroom assessments, teacher anecdotal data on reading and math competency, and parent support for student participation. The students chosen were performing below state academic standards for the student's grade level by more than one of the aforementioned criteria. Students demonstrated a basic or incomplete understanding of the grade level content described in the state standards. Students did not confidently perform to the grade level benchmarks in the state standards. It was hoped that this group of students, on the cusp of meeting academic standards, would demonstrate measurable academic growth and assist the researcher in discovering the secrets of their thought and the impact of Thinking Maps® on their thought within the time limitations of this dissertation. Priority was given to current participants in the Century 21 program, as the research was conducted as part of the Century 21 program.

Students chosen for this study were likely to come from impoverished and transient families. A variety of home languages and ethnic groups were represented. For these reasons parent support in the form of commitment to student participation was a significant selection factor. Century 21 Learning Centers incorporates parent activities in the program. Parent sessions are held to showcase student work. Parents are invited to participate in activities. Surveys are incorporated in the Century 21 Learning Center program to gain parent feedback. Some parents returned application forms when informed that a free lunch would be offered to all student participants.

Procedures

After applying, interviewing and being selected for a Century 21 Learning Center teaching position the researcher met current Century 21 participants and began recruiting for the summer program. The recruitment process began with teaching an introduction/review course in Thinking Maps® to the current Century 21 participants, all current fifth grade students. A series of eleven sessions of 30 min. each were used to present all eight Thinking Maps® and complete a short expository writing assignment using the maps.

Students used the maps and writing exercise to discover and share about themselves. The researcher used these introductory assignments to determine the initial instruction at the beginning of the research project and to develop rapport with future participants. Personal information, classroom behavior, quality of work, and other information were also used to inform the researcher's instruction at the beginning of the summer program. Some students chose to add to their maps or writing on their own time and eagerly shared their work with the researcher and other adults.

Enrollment packets for the C21 summer program were given to exiting fifth, fourth, and third graders. Phone calls to parents or guardians were made to confirm receipt of enrollment packets and answer questions. The phone calls were made by the English speaking paraprofessional for the summer program, used to determine the English language skills of the parent/guardian, and ensure that they understood the details of the summer program. In a few cases a bilingual staff member followed up the call to ensure that questions were answered and understood. Once student participants were identified the researcher began to gather information about each student.

The research project took place within a public school and was conducted by trained and certified professionals of that school. As such, these professionals were well versed on

the legal obligations, district, and school protocols for student safety. If a professional working directly with a student had reason to suspect that the student was in danger (e.g., abuse, neglect, suicide, unsafe environment) the professional immediately would notify his/her superior. Together, the reporting staff member and supervisor determine the appropriate course of action. The first step would be for both adults and the student to talk and get a clear picture of what is happening. Then decisions would be made together or the student would be informed about what must happen in accordance with the law. The student's safety, both physically and emotionally, drives the primary concern of this process. Students are kept informed and when possible included in the process for the purpose of building a sense of security and control in a difficult situation.

Creating a safe environment was critical to this research project. Staff was physically present on the playground and attentive to student activities. The use of a behavior program called Kelso's Choices helped students determine if students could handle the matter themselves or not. When an adult was needed to help students resolve situations a set of information was provided to the adult. This empowers the students and helps them present the situation to an adult in an efficient manner. Adults were then quickly able to address any concerns in an appropriate manner. Within the classroom organization and planning provide the primary means of reducing potential risks to staff and student alike. The room is arranged to provide ease of movement and plans incorporate safeguards for potential safety concerns (e.g. walk in a line, take turns, giving explicit directions).

Open collaborative discussion with teacher and student was the beginning point for correcting any issue of concern. Working together students and adults gained an understanding of the situation and created a plan for improving the situation. In most cases

students eagerly engaged in constructing a better situation and the adult need only encourage this self-directed constructive behavior.

When a collaborative effort between teacher and student was not sufficient to resolve the situation, parents, other school employees, and the administrator were asked to join the collaborative effort.

When appropriate, negative consequences such as exclusion from an activity or reassignment of seating were used. These consequences were generally discussed and mutually agreed upon prior to being enforced by teacher or student. In a few cases students had difficulty making constructive and positive choices and a negative consequence was imposed on the student. A discussion with the student and teacher or paraeducator followed the incident to create a plan to avoid the consequence and make more constructive choices in the future.

The researcher rigorously adhered to the Federal Educational Right to Privacy Act (FERPA). Interactions with staff during routine instruction adhered to the routines established in the public school in which the data was collected. Information that was not relevant to the academic lives of students was not discussed between staff. When it was necessary to share personal information (health issues, medical diagnoses, living situation, family changes...) only the details that affected the academic performance of the student were shared in an effort to support the student's academic growth. These conversations were held behind closed doors and not discussed with any individuals that were not directly responsible for supporting that student.

Each of the summer sessions consisted of academic enrichment activities and curriculum selected by Century 21 Learning Centers and the school district in which these

students attend. Teacher training on the curriculum materials and program guidelines occurred June 29, 2009. A team of two teachers, one paraeducator and a half-time site-coordinator worked as a team at each Century 21 site in the district. Team planning occurred on June 29 and 30, 2009. Instructional strategies were at the professional discretion of the teachers. The researcher chose to use Thinking Maps®, coaching techniques, and reflection as a focus of instructional strategies.

The researcher assisted the participants in each session by guiding individuals and the group in the use of Thinking Maps®. Thinking Maps® were used to organize the thoughts of all participants in the review of content and to assist in making personal connections to the content.

Conferencing was another key instructional strategy used by the researcher. Individual conferences helped clarify participant perceptions, applications of thinking, academic progress. Conferences were also used as a forum to resolve behavioral or group dynamic issues that arose. Some small group conferences were conducted with participants, parents or guardians of participants, and the teachers of participants.

The timeframe for data collection for this research study were four weeks in the summer of 2009. Student contact days were: June 30, July 1, 2, 6, 7, 8, 9, 13, 14, 15, 16, 20, 21, 22, 23, and 24. The student schedule began with academic instruction from 9am- 12pm with a fifteen-minute break for recess. Teacher supervised lunch occurred between 12pm and 12:20. The busses will began loading at 12:20 and departed at 12:30.

Instrumentation

Instruments used to assess student progress were: Math Whizz, Benchmark, DIBLES, Interview, and Observation. These assessments are routinely administered to students as

part of the Century 21 Learning center grant. All of these assessments are proprietary and therefore copies cannot be attached to this application. All of these assessments are based on educational research and normed to provide reliable results. The companies selling these assessments are established and respected in k-12 education. General information about each assessment tool follows.

Math Whizz is a web based interactive application that uses both summative and formative assessment. An initial summative assessment is used to place students at the correct level of academic skill and assign a “Maths Age” that equates to their skill level. Lessons are then presented to students based on their skill level. Each lesson briefly presents a concept and an interactive practice. If the student scores at 80% or higher a new lesson and concept is opened. If the score is below 80% the student may replay the lesson to improve the score. Key foundational or confusing concepts have several lessons to offer adequate practice. Each correct student response earns the student points, which can be used to play games or shop for virtual items. Math Whizz can be reached at <http://www.whizz.us/>.

Benchmark is a reading comprehension program. A summative assessment to be used in conjunction with a cross-referenced library is a significant element of the researcher’s school district’s literacy program. The assessments measure elements of reading comprehension. The correlating teaching guides offer strategies and materials suggestions for use in building each of several defined areas of reading comprehension (e.g. main idea, supporting details, fact from opinion, author’s purpose...). Benchmark Education can be reached at <http://www.benchmarkeducation.com/>.

DIBLES (the Dynamic Indicators of Basic Literacy Skills) is used by this public

elementary school primarily as a measure of reading fluency. Students are asked to read three carefully written passages; the number of correct words read per minute and the number of possible words per minute are recorded. These scores are used as a screening tool to monitor progress. Information about DIBLES can be found at <https://dibels.uoregon.edu/>.

Interview and observation are elements of a constructivist approach to education and encouraged by this district's recent staff development offerings. Literacy workshop is now the norm for delivering instruction in reading and writing. The literacy workshop model provides a structure that includes teacher-student conferences and small skills groups based on individual student needs. Interview and observation are intended for the purpose of formative assessment and instruction. Here are samples of interview questions that teachers in this school and district are encouraged to ask students.

Tell me how you got that answer.

How did you figure that out?

How do you know?

Is that similar to other ideas?

Tell me about your thinking.

What do you need to do to reach your goal?

What would help you reach your goal?

These questions are meant to be a starting point for collaborative and reflective conversation that enables the student to maximize learning and the teacher to gain insight into student strengths and challenges.

While the district and school encourage each teacher to personally develop a recording system, one is not mandated or suggested. This researcher used narrative notes and an electronic template. This researcher then organized each student's collected field notes in a file by student. This enables the researcher to easily access information from several places. All personally identifying information was removed from the data for analysis.

Individual test scores and other teacher data were collected within the sixteen days of instruction. Tests included: district assessments in writing, Math Whizz online assessments, and standardized diagnostic assessments for reading fluency as well as comprehension. Other teacher data included: observational and anecdotal notes, other formative or summative classroom assessments, and student work samples. No assessments or data from the previous or next school year were used to determine student academic progress during the summer.

A portfolio of student created Thinking Maps®, reflective journaling, and other assignments from the summer program served as a record of student thought. The portfolio was the primary means of gathering organized data that would be useful in identifying the development of craftsmanship in student participants. This is where students were encouraged to record their thinking. Portfolio entries were also used as the topic of discussion in conferences and group discussion.

Researcher notes from the classroom sessions included patterns of behavior and thinking. Researcher notes on the setting focused on supports for thinking that are evident in the setting. The researcher collected observational and conference data during the summer program. These notes provided a context in which data was reviewed and instructional decisions made.

Conferences

The researcher used formal and informal questioning to clarify the thinking of each student. Each student was asked to clarify and expand his or her thinking through formal and informal questioning. Formal questioning was directed to all students; student responses were both written or oral. This was part of a formal whole class or small group lesson. Informal questioning commonly occurred in small groups or individually as students are working. These questions were purposefully posed to students to guide him or her to a deeper understanding of the content at hand.

Three parents were asked to describe their student's evident thinking patterns and preferred means of expression. Through those interviews the researcher gained insights that were used to assist the students in making personal connections to the content and increase each student's capacity for craftsmanship. Students were the primary participants in conferences. Questions that assist in the construction of and expression of content were the core of each group and individual conference. A variety of constructivist questioning techniques were used to build the capacity for critical thinking and reflection in the student participants.

Work Samples

Each student created a portfolio. The portfolio consisted of Thinking Maps® that express individual thinking and understanding of academic content. Further Thinking Maps® expressed personal connections and exploration of academic content. Journal prompts that encourage students to think about their own thinking and academic behaviors were also an integral part of the student portfolio. Student work portfolios also contained other academic work that demonstrates student understanding of academic content. Portfolio entries were completed individually, in groups, and as a whole class.

Observational Data

The researcher kept a log of behaviors, interactions, and discussions that gave insight into the development of craftsmanship. The researcher looked specifically for the use of specific details, accurate analogies, facial expressions, body language, vocabulary, and other indicators of critical thinking.

The practical management of data collection presented a significant challenge for the researcher. The researcher was not free to focus solely on data collection and management. A classroom of struggling learners also needed to be managed and instructed at the same time data was collected. The day-to-day routines of classroom management and responsibilities of a classroom teacher demanded significant time and attention. The administrator was shared with another site; this further added to the demands placed on the researcher's time and attention. Since the classroom was comprised of struggling learners, the researcher was often needed to redirect students toward positive and constructive behavior choices. This required some critical and rather creative thinking on the part of the researcher. Habits of Mind and Cognitive Coaching techniques provided a meaningful and positive set of tools with which the researcher was able to encourage constructive student behavioral choices.

The researcher began with an electronic spreadsheet that contained a checklist of topics on which to collect data. The researcher for reading, writing, and Math developed a separate checklist. The researcher based the checklists on state standards. The checklist was intended to aid the researcher in gathering and organizing information. A copy of each subject was made for each student and placed in a three-ring binder organized by student. The researcher planned to carry the binder and record information as discovered. This proved to be an awkward process. The researcher would be talking to one student about the

expected use of a chair, preparing materials for the next activity, and another student would interrupt to share progress on an assignment. The binder at this time was often out of reach. It became obvious that a more effective recording method was needed.

While the organization within the three-ring binder was efficient and provided an adequate comprehensive structure, recording information throughout the day was awkward. During planned conferences the binder was the right tool for the job. Needed information was easy to find and recording of new information was efficient. The researcher's solution was the use of sticky notes.

The researcher began carrying a pad of 3x3 sticky notes when not conducting formal conferences. The researcher wrote the name of the student and just enough information to remind her of what needed to be recorded in the notes binder. Sticky notes were placed on the inside cover of the binder. At the end of the day the researcher would review the sticky notes, place them on the correct page in the binder, or write a detailed description of what transpired on the correct page in the notes binder.

The researcher shared this sticky note system with the paraprofessional working with her and the paraprofessional began placing brief notes inside the binder. The researcher would then record the information appropriately or seek more information from the paraprofessional or student and then record. This sticky note in binder system served as a source of data as well as a means to enhance the communication between teacher-researcher and Paraprofessional.

After the data was collected and permission to use the data had been granted the researcher once again reviewed the notes binder. Data that applied to the research questions was gleaned; all personally identifying information was removed. Then the researcher conducted data analysis for the research project.

The researcher safeguarded the participant's confidentiality while handling data by the use of coding. Each participant was assigned a number and the number identifies all data connected to that participant. The participant's information was devoid of identifying marks when data analysis was conducted. When reporting research findings, participant number alone identified participants.

The researcher ensured the anonymity of individual students by assigning each student a number. Numbers were used to code all data used in the research. Only the researcher knew what number correlates to an individual student. All data has student names removed and replaced with a participant number. The key the researcher used is kept separate from the data and in a secure location only known to the researcher. No connection to the research is recorded on the key. This is to ensure that if the key was located it could not be connected to the research and used to identify student participants in this study.

Assumptions

When used as a reflection and review tool Thinking Maps® organize student thoughts in a meaningful manner. Thinking Maps®, by definition, are a visual representation of thought. Students make connections to concepts that are individually relevant, increasing retention of content knowledge. Students increase their consciousness of personal skill levels, enabling the student to focus on improving areas of greatest need. Individual motivation and frequency of Thinking Maps® use increases as skill increases. Thinking Maps® were shown to significantly enhance student development of efficacy and craftsmanship. This was monitored and evaluated by the collection of student generated Thinking Maps® and other academic work collected in student portfolios. Students were asked to share their perceptions about the

impact of Thinking Maps® and intentional reflection as part of their portfolio

The researcher has chosen a topic with significant potential benefit to the diverse, low-income, and limited English proficient participants. Participants may benefit from focused attention on goal setting and the thought patterns to achieve success that are often not explicitly taught. Intentionally focusing student and teacher-researcher attention on the practice of Habits of Mind that lead to success and improved student academic and social behavior. Students with limited resources often have difficulty understanding what is within their power and the interconnected effects of real life, a complicated situation. Explicit collaborative discussion between teacher and student provided a needed foundation of understanding personal choice and its effects.

The use of visual tools, Thinking Maps® was a research-based intervention for struggling learners. English Language Learners and Special Education students show significant gains when focused instruction in the use of a visual tool is applied (Hyerle, 2004). Thinking Maps® provided a common language in which students can discuss their ideas with limited language and see relationships in a format that is similar to the way it is organized in their brain. The use of Thinking Maps® enabled conversation and thought to be focused, specific and clear with minimal effort.

The use of Thinking Maps® made connections between content areas and other related concepts easier to identify. Increasing the connections a student recognized between familiar concepts deepens understanding and increases the likelihood of recalling information.

Data and Analysis

Qualitative data was gathered on each participant during the course of this action research project.

The researcher began with an electronic spreadsheet that contained a checklist of topics on which to collect data. A separate checklist was developed for reading, writing, and Math. The researcher based on the state standards developed the checklists.

While the organization within the three-ring binder

During planned conferences

This sticky note in binder system served as a source of data as well as a means to enhance the communication between teacher-researcher and Paraprofessional.

After the data was collected and permission to use the data had been granted the researcher once again reviewed the notes binder. Data that applied to the research questions was gleaned; all personally identifying information was removed. Then the researcher conducted data analysis for the research project.

File box encoded data that addressed a research question

Descriptions of patterns and changes in student use of Thinking Maps® that give insight into the degree of craftsmanship were identified. Connections between the instructional use of Thinking Maps® and student performance were drawn. This data will take the form of student portfolios, researcher observation notes, and conference notes. The researcher identified examples of student use of specific vocabulary, and returning to an idea to extend the idea as well as other patterns discussed in the researcher's findings.

Findings

While working with Thinking Maps® and Habits of Mind this researcher found it was not just beneficial to students, it was valuable in her own efforts to complete this research project. The findings for this research project were organized in a Thinking Map that categorizes information. It can be found in Appendix G.

Program Patterns and Norms

Twenty-one students completing grade five were selected from two elementary schools for participation in the Century 21 Learning Center Summer Program. Twenty students came from one elementary school and one from a second elementary school. Both elementary schools are located in the same large suburban school district. The primary elementary school has not met the requirements for adequate yearly progress based on No Child Left Behind for two consecutive years and was in phase one school improvement during the 2008-2009 school year (OSPI, 2008). The student population in October 2007 was slightly over 34% white, 17% Hispanic, 17% Asian, and 15% Black (OSPI, 2008). Included in the white population are many eastern European immigrants with limited English proficiency as well as individuals that speak English as their primary language. Included in the black population are immigrants and refugees from African countries that have limited English proficiency as well as individuals that speak English as their primary language. In May of 2008 66% of the student population at this school qualified for free or reduced price lunches. 35% of the student population qualified for English Language services in May of 2008 (OSPI, 2008). Based on this information it was likely that the student sample would be comprised of several ethnic and cultural groups and many of the students would come from families with limited income. The 2009-2010 school year brings phase two of school improvement as mandated by NCLB legislation. The school experiences a continued increase in ethnic

minorities, low income families, greater need for English Language and special education services in the 2009-2010 school year. It is interesting to note that many of the students in this school self-identified as “White” on registration forms are immigrants from Russia, Ukraine, Turkey, and India. These students generally qualify for English Language Learner (ELL) status with parents requesting interpretation services when communicating with English-speaking school staff. Another interesting situation is with students of mixed race. Some families choose one race on the form, some none, some check multiple boxes, and others choose the newly added mixed race option. Some families consider the race question offensive and choose not to identify their race on official forms leaving the administrative staff to determine how to fill in that particular space on the form.

Neither school in which the students attend has exposed students to the Habits of Mind. The primary elementary school that the participants attend during the regular school year has been exploring behavior systems that reward positive student behavior. The school wide discipline policy focuses on three aspects of academic success: Respect, Responsible, and Ready to learn. Respect is defined as treating others with kindness. Respect is determined by how you would feel if someone treated you the same way. An example, we don't hit others because we don't like to be hit. Responsible is defined as doing what is right. It is determined by how an action affects the group as a whole. An example, we put our supplies away neatly every time we use them because we want to use them again later. Ready to learn is defined as having materials and behavior that will help you do your work. Ready to learn is determined by attentiveness to teacher directions as well as the efficiency with which directions and routines are followed.

The site of the research project is also a site of the district free summer lunch program. The teacher-researcher and the other teacher for the summer program divided the tasks and

responsibilities of administering the free lunch program. District representatives visited each site to ensure adherence to state and federal mandates were closely followed in the distribution and recording of the free lunch program. All C-21 Learning centers sites were distribution sites for the free lunch program and a bus was adapted to serve as a distribution center. The bus went to designated low-income apartment complexes and served any child that requested a lunch. The summer C-21 Learning Centers staff were responsible for managing the free lunch program at their sites. Staff recorded, reported, and distributed lunches to any individual under the age of eighteen that arrived on site and requested. All students attending the summer program and participating in this research project eagerly received their free lunch each day of the program. The lunch consisted of a sandwich, two side items to fill out the requirements for fruit and vegetables, and a dessert. One student brought a sandwich each day to add to the lunch. Several students commented while in line on many occasions that lunch was the reason to come to school. The paraeducator, while keeping order as the students waited for their turn in line, gave the students opportunities to discuss their eating habits and the availability of food at home. Many students revealed that there were limited resources at home and that this was their only meal for the day. This is confirmation that the students selected for this research project were indeed the students intended to benefit from the C-21 Learning Center program and the district free lunch program.

Data Analysis for Class Patterns

A total of 21 students returned application packets for the summer program. Of the 21, four withdrew before the program began. One never attended and withdrew on the seventh day of the program. One attended the first day of class and withdrew the second day. One student attended the second and third days of class and withdrew on the fifth day. Two students did not withdraw from class but were present for less than 75% of the program. These students with high absentee rates are not considered in the data analysis. Of the 21 students originally enrolled in the program twelve were present for 75% or more of the program, participated and are included in the data analysis. Most participants attended fifteen days of class. Attendance of participants included in this research ranged from twelve to sixteen days.

It is interesting to note that all of the enrolled Hispanic students either dropped or withdrew and were not included in the data. Only one Pacific Islander enrolled and withdrew before the start of the program. All students identified as white were nonnative English speaking. There were only four of the twelve students counted as participants that speak English as their primary language.

The primary elementary school has noted that low state assessment scores of Hispanic students is a reason the school is in Improvement. The school has further noted that while other ethnic groups have improved their scores on the state assessment, Hispanic students remain stagnant. It is interesting to note that the school has made special efforts to reach the Hispanic families. Language classes and potluck informal discussions with the principal are two high profile examples. Information is often translated into Spanish and several bilingual staff members intentionally speak with Hispanic students and families in Spanish during the regular school year. During the summer program these services were not

offered. Efforts with other minority groups only include language assistance.

All students in this research project were in the summer between fifth and sixth grades. The ages of those returning application packets ranged from ten years and five months at the beginning of the research to twelve years and three months. The two youngest students to return application packets were both ten years and five months and both dropped before the start of the program. The average age of those not completing the program was eleven years six months. The mode or most common age of those enrolling and not completing the program is eleven years and eight months.

The age range of those participating in the program with at least 75% attendance was eleven years one month to twelve years three months. The average participant age was eleven years six months. The mode or most common age of the participants was eleven years one month. The participants were slightly younger on average than those that dropped. The oldest applicants participated in the program to the end.

Of the twelve participants, 75% or better attendance, there were six different primary languages spoken in their homes. Only four participants spoken English as the primary language in the home. None of the native English speakers were Caucasian. Primary languages were Russian, Ukrainian, Turkish, Vietnamese, Punjabi, and Nuer (Sudanese Tribal language). All were bi-lingual first or second-generation immigrants except for the speaker of Nuer. As a Sudanese refugee this participant had oral familiarity with many languages. Neur is the first language of the participant and continues to be the family's primary language. Of the students enrolling and not participating were all five Spanish speakers and three native English speakers.

As the researcher identified the ethnicity of each student some interesting findings emerged. There was no clear category to place a participant of mixed race. One participant is

“Black-Hispanic”. There was a continuing discussion over the distinction between Black and African. Many Black students and families strongly identify as African due to their refugee, immigrant, ethnic status; while others see themselves as Black and having no attachment to or understanding of Africa. The researcher chose to use the category name Black. While categorizing Asian students the researcher discovered that many families of Eastern Indian descent self identify as Caucasian. They experience stronger ties with Europe than with China or Japan. This researcher categorized all students of Indian descent as Asian. Even more interesting are the families that consider the question an invasion of privacy and refuse to answer. This researcher was able to hear their concerns and reassure them that the question was merely a way to ensure that all individuals received what they needed to be successful. It was a reflection on the way the school was treating its students. The ethnic breakdown of the participants was: four Black, four Caucasian, Three Asian, and one Mixed Race.

Due to the high transient rate at this school the primary school has a formal program to welcome all new students into the school. One paraeducator maintains a “Welcome room” throughout the regular school year. All students spend their first days receiving instruction about the school and taking assessments. Afternoons are spent visiting the classrooms and getting to know the teachers and students in the appropriate grade level. Based on the assessment results for the assessments given in the Welcome Room and social interactions during visitation the student’s best-fit placement is determined. Students are placed in a regular classroom and identified for possible special services based on chronological age and supporting assessments. One participant in this class is a refugee and has received Newcomer support from the ELL department in this elementary. The newcomer program at the primary elementary school provided assistance in acclimating to school here in the United States. Within two weeks she was deemed to possess the basic knowledge and skills in

English Language and school behaviors to be fully integrated into the regular classroom. This is highly unusual in the history of the school. Most of the refugees and immigrants that arrive directly from another country require nearly a year of specialized instruction. Then they transition to more academically focused ELL instruction for at least two years.

As a whole, the class slightly improved in reading comprehension. The average raised one question from nineteen to twenty correct out of 36 possible. The range of scores narrowed. The comprehension pretest scores ranged from eight to 30 correct while the posttest ranged from twelve to 27 correct. The lower scoring students correctly answered more questions. In the area of text structure and elements six students gained one correct answer. In the area of relating ideas three students gained one question, two students gained one question, and one student gained three questions. In the area of distinguishing important information two students gained three questions, one student gained one question, and two gained two questions. In the area of interpreting author's views and making judgments four students gained one or two questions.

The area of literary elements was intriguing to this researcher. Three students lost one question and one student lost three questions. Two students gained one question. The mode was zero questions correct. This is the area in which most students tried to focus discussion. Discussion was limited to short fill in the blank responses. When asked to explain their choices, discussion groups responded with surprise. They shared that this is what they always do in groups and it made the work fast and easy.

The researcher saw a need for intentional teaching in group discussion, Habits of Mind, and reading comprehension. The researcher delivered interactive instruction using probing questions to each group and to the whole class. The groups found these questions to be challenging and resisted initially. The researcher asked the groups to practice persistence

and listening with understanding and empathy. After three days the conversation in each group made a noticeable shift. There was less reporting and more dialogue. Students asked why events in a story were important. Why a character acted in a particular way. And wanted to know the opinions of other group members. At the end of group discussion time students had difficulty ending their discussions. In the beginning, group discussion was unfocused, ended early, and often included more social topics than academic. By the end of the program discussion was becoming text focused, interactive, inclusive of all members, included a variety of comprehension skills, presupposed reader metacognition, and was student led.

Data Analysis by Individual Student

Of the 21 students that applied and were enrolled in the summer program, twelve participated for 75% or more of the program and are included in the research. A description of each participant follows.

Participant number three is a female. She was eleven years and one month at the beginning of the summer program. She has an Individualized Education Plan (IEP) for a Specific Learning Disability (SLD). Upon observation, and discussion with student and Mother the researcher discovered that Dyslexia is this student's SLD. Previous attempts to assist this student have met with limited success and currently the student feels singled out. Student correctly answered eleven questions out of 36 correctly on the reading comprehension pretest. The student answered one more question correctly on the reading comprehension posttest. In the area of relating ideas the student went from a score of zero to a score of three out of a possible four. This is a pattern found in the student's daily work and conversation. She began to ask about and identify content connections within literature and other situations. When asked if this was a new pattern for her, the student responded that

"I never sawd those ideas before. An they just pop into my head.

Sometime I seed the idea in my head and it look like a map.

Sometime I just hear me ask a question. (Personal Communiqué, July 21, 2009) "

While this student's comprehension score increased slightly her reading fluency decreased from 94 to 75 words correct per minute (wcpm). When asked for her thoughts on this decrease the student responded that she reads differently now. At the beginning of the program she was focused on decoding the passage with speed. Now she wants to see a picture in her head when she reads. She is no longer feeling the pressure to speed through a passage with little to no understanding of what she read. The student is now primarily seeking

information and entertainment from her reading. This student made a slight gain in Maths Age from 9.42 to 9.52. From the computerized Math Whizz report it is evident that this student spent her time on lessons and tests. Little time was spent on games or other incentives. Another pattern evident in this student's math activities is that she rarely repeated a lesson or test to improve her score. She would choose a new lesson on a topic instead of repeating a lesson on the topic. Her scores vary widely from zero to 100% as well as the time taken to complete a lesson or test. Her times range from 48 seconds to six minutes and eighteen seconds. The length of time spent on a lesson or test does not indicate to the score received on the lesson or test. This student improved her writing in length and detail while maintaining clear paragraph structure. In her writing assessment she chose to write about how Thinking Maps® have helped her organize her writing and understand what she reads.

Student number four is a female. She was eleven years one month at the beginning of the summer program. She does not qualify for any special services. She uses her height, physical presence, and athletic abilities to her benefit when possible. Her goals are:

“Reading: moving up more than 3 reading level. Math: being capabol of doing mult to at less 15. So it will challegn for me Writing: syay on topic. I want to get good grades I love writing poems. If you ask me to write a poem I Will. (Student Portfolio Entry, July 1, 2009)”

In reading fluency her pretest score was 120 wcpm and her posttest was 147 wcpm. The percent of words attempted that were read correctly also increased from 99% to 100%. In the area of reading comprehension her pretest score was 23 correct and the posttest was 25 correct. The additional two correct answers were in the area of distinguishing important information. All other comprehension scores were identical for student number four. The

district writing assessment pre and post scores also revealed an increase. Student number four raised her score a half point on the scoring rubric from a two to a 2.5. The noticeable difference in her writing was in the area of added detail and organization. Early work from the student's portfolio were one to three sentences in length and contained the use of original drawings with labels add detail and provide context for her writing. Later work from the student portfolio is devoid of assistive illustrations and contains more specific details as well as enough length to demonstrate well-defined paragraph structure. Based on the computerized report from the Math Whizz computer based program her maths age rose slightly from 9.66 to 9.67. Neither the length of time spent on a Math Whizz lesson or test or the number of times the student asked for assistance from the program seems to have impacted the accuracy of her responses. Student number four scored higher in topics requiring memorization than those requiring the application of mathematical concepts in context. At the beginning of the summer program the student relied on the teacher and other students as she created Thinking Maps®. When asked to share her own thinking on the map she was hesitant and frequently asked if the idea she wanted put on her map was correct and where it should go on the map. While student number four struggled with the concept of personal perceptions being neither right nor wrong she had no difficulty articulating her reasoning for her perceptions. After the teacher used inviting and open-ended questioning to guide the student to organizing her logic in the visual format of Thinking Maps® her oral self-expression improved immediately. This was evidenced by the use of specific vocabulary, specific references to text and experiences, and a clear thought structure based on the eight thinking skills that are the foundation of Thinking Maps®. In the third week of the summer program student number four showed a change in her writing patterns. Her writing underwent

the same transformation of her speech. She intentionally included text references and personal experiences in her writing to support her ideas. When asked about this change she shrugged and said she did it because it sounded more like a real writer. When asked if the Thinking Maps® helped her improve her writing she first replied in the negative and then recanted to say “Kinda. (Personal Communiqué, July 21, 2009)” She said she didn’t like writing them because it made the writing take longer to finish but she started them so her mind would focus. This response revealed a behavior pattern and a motivation for the pattern. The student’s true goal in writing was to be finished. The secondary goal was to complete assignments just well enough that the adults looking at her work would accept the work. With student number four the Habits of Mind, striving for accuracy, persisting, taking responsible risks, and remaining open to new learning are clearly being avoided. The teacher-researcher saw that the student was open to strive for accuracy as long as it did not require concerted effort. The teacher-researcher put this finding based on observation to the test with this student. The teacher-researcher asked how accuracy and precision can help you get your work done quickly and well. Student number four responded. “Help people understand What you’re Saying. (Student Portfolio entry, July 22, 2009)” Through a series of carefully constructed questions the student expounded on this idea by saying that other people can’t help you improve your work or score your work if they don’t understand your work. She also showed an insightful application of applying past knowledge to new situations when stating that she often abandons books she does not understand. The teacher-researcher continued used these naturally established patterns in student number four to build her capacity for persistence and managing impulsivity in similar situations throughout the summer program.

Student number five is an eleven year and eight month old male. He does not qualify

for any special services. When guided to set goals the student was not able to do so. Even with guiding questions the teacher-researcher was only able to get the student to shrug his shoulders and offer noncommittal responses to goal setting questions. The goal setting conference ended with the student saying, "Just tell me what to do and I'll do it. (Personal Communiqué, July 1, 2009)" Student number five prefers to work alone. A large proportion of his social interaction is complaining or arguing. It is rare to hear him voluntarily express pleasure. Student number five has difficulty independently following routines and procedures. Student number five frequently sits in his seat and waits for instruction or direction when he should be actively engaged in routine class procedures for completing assignments. If others are working he will often put the same materials on his desk that others are using and open a book in his lap to read. If redirected to follow routines or complete an assignment he often looks around to find others that are also in need of redirection and attempt to justify his behavior. This is evidence of a pattern of task avoidance. Student number five began the program with a reading fluency rate of 144 wcpm and ended with a rate of 185 wcpm. He maintained 100% accuracy of the words attempted. When asked how he maintains his reading speed he shrugged his shoulders and said "I like to read. I just see the words real fast. (Personal Communiqué, July 22, 2009)" Student number five answered two less questions correct on the posttest than the pretest. His test scores in reading comprehension went from 29 to 27 correct. When asked why he thought he missed two more questions he shrugged his shoulders. When asked probing questions about his attention to detail and persistence when taking the test he responded with more shoulder shrugging. This outward behavior leads the teacher-researcher to question his internal motivation. The teacher researcher also noticed other behaviors that reveal a pattern: constant redirection needed to complete assignments, work that lacks organization and is difficult to read, and that

standardized assessments generally take him half as long to finish as standardized test directions state. The teacher-researcher decided to test this student's response to immediate extrinsic rewards: praise, candy, trinkets, choice in activity, and doing special jobs with the teacher-researcher like setting up for lunch. The teacher-researcher noticed that when the reward was immediate and could be obtained with 30 minutes of effort or less; the student was eager and generally successful. If the student had to wait for the reward or had to stay engaged in academic activities for longer than 30 minutes the student would struggle, get frustrated, begin complaining, and finally give up. Attention was given to the level of difficulty of each task to ensure that it was within the student's independent capabilities. Attention was also given to the length of time each activity required. All activities could be completed in less than 30 minutes. Students were expected to complete items from a menu of activities, sometimes in a particular order. When presented with more than one thing to do in a given and extended timeframe the student would not complete any task regardless of its simplicity without adult supervision. The teacher-researcher and paraprofessional worked together to assist this student in transitioning between tasks and deciding which task to complete next. Rewards were given for independent and successful completion. Rewards were also given for positive language. Student number five's writing remained at a rubric score of two. When asked what could be done to make the writing better the student quickly responded with several accurate ideas. When asked how to implement these ideas he had several concrete ways to apply the ideas. When asked why he chose not to implement the ideas he shrugged his shoulders and said he didn't know. The teacher-researcher had several conversations with this student over the course of the program about the importance of meeting and exceeding educational benchmarks and behavioral expectations. Topics of impromptu discussions included: What would happen if an adult did that? Do you think that behavior will help you get

a job? What behavior would help you get at job? Why do we practice these behaviors before we need them? Why are you choosing to limit your choices? What do you want to do when you are an adult? What can you do now to help you decide? What can you do now to prepare? The last day of class was a field trip. The teacher-researcher assigned this student to a small group with a certified teacher that the student was familiar with and offered to be a chaperone for the field trip. The teacher-researcher told the student in front of the teacher-chaperone that his job was to keep track of the teacher-chaperone and be her clock. This required the student to know the schedule for the day and be aware of his surroundings. He successfully maintained proximity to his chaperone and safely arrived at designated meeting areas. The teacher-chaperone also reported that he used a map on several occasions to assist the group in arriving at their destination or to determine where to go next. The teacher-chaperone further reported that his language was largely positive and she did not recall him complaining. On the bus on the way home he grinned ear to ear and proudly reported that his chaperone did not get lost, said she had a good time, and made it to lunch and the bus on time. He was promptly rewarded with the items he had chosen, a pencil and candy bar. This is evidence of his emerging capacity for persistence, managing impulsivity, gathering information from his senses, applying information to new situations, and listening with understanding and empathy. Interestingly, he chose not to eat his candy bar immediately. He put it in his pocket and held it. He also voluntarily started conversations with the teacher-chaperone and the teacher-researcher about what he had seen and thought while on the field trip. He referred to classroom experiences and requested affirmation of his observations and perspectives. This was the first time this student voluntarily engaged in academic content discussion. Student number five maintained a 9.2 maths age during the summer program. Avoidance was the primary skill this student demonstrated during the time scheduled to

complete Math Whizz lessons. The student frequently would restart his computer and adjust settings while complaining about the slowness of the computer. When the teacher-researcher investigated she found the computer to be operating in the same manner as the rest of the computers. The teacher-researcher instructed student number five to stop interrupting the computer and to simply follow the directions given. A protocol, established for all students, was strictly enforced with this student. Each time the student was found to be using the computer other than as instructed, a consequence was enforced. The first time the teacher-researcher or paraprofessional would inquire as to the reason for the off task behavior and either issue a warning or offer assistance. The second time, the same inquiry was made and the consequence was either assistance or time out for three minutes. If a third time occurred in the same session in the technology center the consequence was time out for the rest of the session in the technology center. After three days of reminders each time he attempted to do something other than access the Math Whizz program and complete the academic elements of the program, he rarely needed this reminder. Upon review of his progress report it became evident that while the student had the correct information on his computer screen, he was not interacting with the program. He rarely completed a lesson or test during a session in the technology center. When asked about thinking patterns and his use of Thinking Maps® student number five continued to amaze the teacher-researcher with his avoidance techniques. The most obvious pattern was minimal effort to get the adult to go away. Evidence of this pattern is found not only in his conversation and behavior, but in his written work as well. Here a few examples.

“JuurnaL PromPt

How can stricing for accuracy, ClaritY, and Precision heLP you?

it can heLP Me

in Writing and

it Could heLP me

in other things.(Student Portfolio Entry, July 20, 2009)”

“what Kids of thinkings heLPS you make good decisions?

Brain thinking is When you use your brain to Think.(Student Portfolio Entry, July 21, 2009)”

To the surprise and chagrin of student number five his usual nonanswers and unfinished assignments earned him a special seat in the main traffic pattern of the teacher-researcher and paraprofessional. The student was frequently directed to answer the question asked, write using correct capitalization, write so others can easily read his writing, and the like. His response was initially to fold his arms over his chest and exclaim that it was not fair. The adult response was to simply walk away and return in about two to three minutes and ask if he had addressed the issue that was pointed out to him. Over the course of the summer program the habit of managing his impulsivity and persisting showed evidence of development. With no adult intervention, student number five turned in a significantly more readable piece of writing for his posttest. The posttest was twice the length of the pretest and contained significantly more detail directly related to his chosen topic. He also correctly used all stages of the writing process (prewrite, draft, revision, final). This exciting milestone in his behavior showed signs of becoming a habit when done with no prompting and was repeated in parts in his daily assignments. Unfortunately, the scoring rubric for the writing assignment used, as a pre and posttest, did not put a high value on his areas of growth. His growth was seen only when reading the whole rubric in detail and comparing pre and posttests. His growth was not reflected in the overall rubric score reported in his report card. Over the

course of the program student number five showed evidence that his capacity for developing Habits of Mind was increasing. As previously stated, the student showed patterns of increasing: persistence, striving for accuracy, gathering information through senses, listening with understanding and empathy, and applying past knowledge to new situations. The effect was most evident in the final day of class on the field trip; a periodic openness to continuous learning and responding with wonder and awe.

Student number six was an eleven year five month old female. She does not qualify for special academic services. She attended 75% of the sessions in the summer program missing days one, two, four, and twelve. On day three of the program she entered the room and directly confronted the teacher-researcher. She demanded to know why the teacher-researcher called her mother and told her that she was not in school. The teacher-researcher responded by maintaining eye contact and smiling as she welcomed her to class and told her how happy she was to have her joining us. Student number six sighed, rolled her eyes, and began speaking in a calmer tone of voice. She asked again why the teacher-researcher called her mother to report her absence. The teacher-researcher explained that most important part of her job was to make sure all the students on her roster were safe. Part of that doing that job is to take roll every morning and submit it to the principal. The principal then calls the parents or guardians of all students that are absent out of concern for their safety. If the student is safely in an adult's care then she says thank you and have a nice day. If the student is missing or there is reason to be concerned then the principal is required by law to investigate and see that appropriate assistance is rendered to ensure the safety of the student. It takes a lot of adults working together to take care of each student. The conversation was repeated on day five although much shorter in duration and less emotion was displayed by the student. Her absence on day twelve was a planned shopping trip and

the call reporting her absence was reported to the teacher-researcher the following day in passing, with a smile, on the way to recess as she described her new wardrobe. The teacher-researcher noticed this pattern of defensiveness each time any adult made a request of the student. The teacher-researcher took care to explain the reason for all inquires, directives, and requests of this student. The justifications of the teacher-researcher's actions along with the consistency with which they were executed were consistently followed with a more receptive demeanor in the student. Student number six was often the decider of student games and activities at recess. She often sought to collect a group of girls around her. In the classroom she attempted to tell others what to do and report her choices. She rarely completed her work without the teacher-researcher and paraprofessional reminding her to stay on task. The content of her conversations were not limited to academic tasks. When an opportunity to socialize presented itself she frequently guided discussion to more social topics such as: relationships, beauty tips, shopping, movies, and other free time activities. Student number six showed a drop in her oral reading fluency test from 174 wcpm to 166 wcpm. Her accuracy in oral reading remained at 100% for the duration of the summer program. She gained one question on the reading comprehension test. She went from 24 to 25 questions correct. Student number six also increased her maths age during the summer program from 9.39 to 9.42. Student number six continued her trend of improvement in writing; going from a rubric score of two to 2.5. When asked what she did to improve her work she responded with several strategies and metacognitive awareness of when to apply each one. Student number six felt she had little need to focus on her reading speed since it was above grade level. She continued to practice so she "didn't go back. (Personal communiqué, July 22, 2009)" The strategies that student number six tried and found to helpful in the summer program were the

use of Thinking Maps® and the use of Habits of Mind. She frequently mentioned that persistence and managing impulsivity were where she started. Then she tried to figure out what to do by listening with understanding and empathy, applying past knowledge to new situations, and thinking about her thinking. The next thing she routinely did was plan. She would make a Thinking Map® on her paper or in her head. Her last step she saw was doing the task. She later added that she checked her work or her thinking by asking herself “Did it work? (Personal Communiqué, July 22, 2009)” This student beautifully outlined for the teacher-researcher the pattern seen in the class as a whole in varying levels of progression and intentionality. The development of the Habits of Mind will be explored later in this research paper and may warrant further research. In math her strategy was to replay/repeat lessons for higher scores. Her first attempts at a concept generally resulted in scores of 30% to 50%. She quit replaying/repeating lessons when her score was 90% or higher. When asked to explain her actions student number six responded by explaining the importance of striving for accuracy in mathematics.

Student number seven was an eleven years and three month old male. Student number seven does not qualify for any special academic services. He is generally soft spoken and avoids situations that draw attention. Student number set the following goals: “Writing main Ideas Writing goal Spell everything right math goal adding a subtractin fractions” (Student Portfolio Entry, July 1, 2009). While this student was able to set these goals he was not able to devise a plan to achieve these goals. The teacher-researcher used questioning techniques to raise his awareness of possible strategies to meet his goals. He decided that listening with understanding and empathy, and striving for accuracy would be his focus and help him reach his goals. Student number seven dropped his oral reading fluency

from 147 wcpm to 129 wcpm while increasing his oral reading accuracy from 96% to 100% of the words attempted were read correctly. His reading comprehension score increased from 21 to 24 questions correct. His improvement in comprehension was in the areas of distinguishing important information, literary elements, and text structure and features. His writing remained at a rubric score of two throughout the summer program. His maths age also remained constant at 10.26. The student appeared to lose interest in the lessons in the Math Whizz program about halfway through the program. He had earned enough points from lessons and tests that he could spend most of his time playing games on the program. It was difficult for the teacher-researcher to catch this behavior pattern during the time the entire class was engaged in Math Whizz. By reviewing the progress report the pattern became obvious and was addressed in a conference. The student said he was tired of the program and that it was kinda like guessing all the time (Personal Communiqué, July 16, 2009). This information led the teacher-researcher to discover the need for specific instruction in English embedded in the mathematics content lesson. Through conferencing the teacher-researcher inquired about the student's use of Thinking Maps®. Student number seven stated that he found them challenging to create and that they made his head hurt. He also said that he had greater understanding of what he was reading after creating a Thinking Map®. Student number seven also expressed that using the maps helped him with English vocabulary. While he did not qualify for English language services he frequently had difficulty with academic and content specific language. He said that when he saw blank spaces on his map he knew he needed to get help. Student number seven did not enjoy rereading text in order to fill out a Thinking Map® but found that the structure of the map and review of text gave his brain time to work. During the final day of class student number seven voluntarily used Habits of Mind.

While on a tram ride through the open area of a wildlife park student number seven was sitting with student number twenty. Both students were excited and pointing to animals and their surroundings. They asked for the English names of the animals, land formations, and plant life. This was an example of the motivating force emotion and a stimulating environment can play in learning. It is also evidence of the stimulating nature of the field trip location. After about ten minutes of gathering data through their senses, managing their impulsivity, striving for accuracy, and persisting the students began to shift their actions slightly. They took responsible risks and communicated with more precision and clarity by using the English words for more things around them. This led to applying past knowledge to new situations and metacognition in an expression of wonder and awe. As the tram rounded a corner the students saw a wetland area with several birds, small animals, and different plant life. Student number twenty gasped, pointed, and said "I know what that is...It's a ...what do you call it... ahhh....ahhh...." Student number seven exclaims "A habitat." Student number twenty shouts, "Yeah, Yeah, I know...A habitat. A wetland habitat. See it's got animals, food, water, home." The teacher-researcher, in great anticipation and while grinning with pride, asked how do you know that? Both students responded in unison, "'cauz we read it. I did a Double- Bubble and a parts map. (Personal Communique, July 24, 2009)" The interdependent thinking expressed by these two students was definitely a habit. From the very beginning of the program students seven and twenty tried to manipulate their environment so that they could work together. They chose seats near each other, stood in line together, played at recess together, and shared lunches. Their constant proximity to one another had enabled them to anticipate the needs and actions of the other. They had developed a friendship with an equal balance of power that offered them security and encouraged personal growth. Academic orientated expressions of this reciprocal and interdependent thinking were common in the classroom. They explained

words and directions to one another, sometimes in English and sometimes not. They offered suggestions for improving each other's assignments. They came together and asked questions to ensure that both of them had a clear understanding. When asked independently why they did these things both students responded by saying they did better work and it was easier when they worked together. They also expressed that they helped each other do their own work and made sure that both of them had good and different work. On several occasions the teacher-researcher observed these two boys including others in their work together. The teacher-researcher praised their collaborative efforts and publicly acknowledged their efforts.

Student number nine is an eleven year and nine month old male. He qualifies for special services in English language and has an individualized Education Plan (IEP) due to his specific learning disability. Student number nine has great difficulty conforming to many of the common behavioral norms of a classroom setting. He prefers to be physically engaged with his surroundings. He touches objects as he passes by them and often picks up small objects. He frequently moves objects and watches while the owner searches for the object he moved. His constant movement and interactions with the personal property of others prompted the teacher-researcher to make several accommodations to increase the likelihood of his success. Student number nine was given an assigned seat in the front of the room isolated from the rest of the class. He was invited to join groups for specific tasks and for a specific timeframe. Individual students were invited to join him at his desk for specific tasks completed within a specific timeframe. This student was checked in with every two to three minutes by either the teacher-researcher or the paraprofessional. These check in times consisted of observing the student to see if he was in the correct location and engaged in an appropriate task. Redirection and closer observation were given as appropriate. Student

number nine began the program by putting the correct materials on his desk after several prompts. If written work was required he generally made unidentifiable marks on his work and would often crumple the page and attempt to throw it away. The teacher-researcher's daily use of a spiral notebook, as a student portfolio, for most assignments made this more difficult. Student number nine was encouraged to choose a partner and work together to complete most written work. The student began the program choosing the paraprofessional or the teacher-researcher as a work partner. About halfway through the summer program, after many adult guided work sessions with a variety of classmates, he developed a dependent working relationship with student number eighteen. Student number eighteen was unfamiliar to most classmates because he attended another school during the year. Student number eighteen served as a role model and critical friend to student number nine. In their first work sessions student number nine attempted to copy the work of student number eighteen. With the guidance of the teacher-researcher and the paraprofessional they developed a working relationship that kept student number nine engaged in the academic task through to completion and incorporated more original work by student number nine. Students nine and eighteen used oral language that demonstrated an increasing knowledge of academic and social language skills. They attempted to collaborate when determining answers. They both shared their understanding of the topic and at times took the risk of recording different answers to see who was "right". On occasion they recorded both understandings and who held each perspective. Student number nine increased his oral reading fluency from 113 wcmp to 123 wcpm while his accuracy decreased from 99% to 96%. Student number nine increased his reading comprehension from twelve to fifteen questions correct. Making judgments, distinguishing important information, and context clues were the areas of improvement in comprehension. His writing remained consistently scored at a one on the

scoring rubric. Student number nine increased his maths age from 8.21 to 8.36. The student, as the reason for his math gain, identified a development of the Habits of Mind: Managing impulsivity and persistence. Early in the summer program the teacher-researcher set managing impulsivity as a behavioral goal for student number nine. Each time the student succumbed to his urge to blurt out comments or wander around the room he was prompted with something similar to “please manage your impulsivity by raising your hand”. In the second week of class, about halfway through the summer program, he would begin to blurt out or otherwise be impulsive, catch himself and stop. Then he would say, “...Manage your impulsivity and ...please”. Student number nine stated that he found Thinking Maps® to be difficult to create. He said when he made one he “got it better” and could “member more stuff” (Personal communiqué, July 20, 2009).

Student number twelve is an eleven year and seven month old black female. Student number twelve had developed enough English proficiency that she does not qualify for English language services. Student number twelve is an observant and soft-spoken student. She is never the first or last to volunteer for a task or share her thoughts. She generally does not speak unless prompted. She chooses to work and socialize with females that share her quiet demeanor. She is diligent in academic matters. She shared with the teacher-researcher that she and her parents believe that school will make her life better so she works very hard. She spends her time out of school caring for her younger siblings and wants to become a nurse or a “peditriction”(Student Portfolio Entry, July 20, 2009). Student number twelve’s goals are focused and realistic. She wants to: use detail in her writing, find detail in her reading, understand details in math, and not be afraid to ask questions. Since these goals were expressed before the teacher-researcher discussed Habits of Mind with the class the

teacher-researcher inquired to determine the student's reasoning. Student number twelve stated that you have to know details before you can understand. Details appeared to her to be the building blocks which one used to create ideas and concepts. Without the details she said she knew something was missing. She said she always looks for details and when she does not know where to put them she looks for more details to make a new idea. When asked what she does when she has an idea but not very many details; she responded by saying that she looked again and found more details (Personal communiqué, July 2, 2009). The teacher-researcher used this metacognitive awareness of the use the Habits of Mind: striving for accuracy, persistence, managing impulsivity, listening with understanding and empathy, using past knowledge in new situations, gathering data through all senses, and remaining open to new learning. When conferencing with this student the teacher-researcher intentionally posed questions that required student number twelve to articulate this type of self-awareness and application. Student number twelve increased her oral reading fluency from 113wcpm to 132wcpm. Her accuracy remained at 100%. Student number twelve decreased in reading comprehension from 30 to 24 questions correct. Student number twelve maintained a rubric score of three on her writing, which is meeting state grade level standards. Student number twelve increased her maths age from 7.2 to 7.59. When asked how she was able to make improvement in math and reading fluency while holding her grade level performance in reading accuracy and writing, she responded that she focused on striving for accuracy. "I just watch for details and put them in the right place in my head.(Personal Communiqué, July 23, 2009)" As student number twelve expanded on this idea she revealed that she was making mental use of Thinking Maps®. The maps she did in her portfolio were partial reflections of her thinking. It took time and effort to write the maps that she chose to use in other ways. She

saw the written map as telling just enough for someone to “get the idea” and not so much that you get tired or they get bored (Personal Communiqué, July 23, 2009). She said the best thing about Thinking Maps® was that it made it easy to write after you made one. In a reflection recorded in her portfolio (July 20, 2009) student number twelve stated that Thinking Maps® were also good for helping you study for tests because they gave you the ideas without confusing you. This student had several versions of assignments in her portfolio, compared to one or two versions with erasure marks in the portfolios of her classmates. She also said that she liked looking back at her work and making mental revisions to her work. She did not want to change her work because she appreciated seeing the steps in her thinking process. She preferred to make new “mind pictures” of her thinking. Student number twelve said she liked the pictures to stay clean because in her mind they stayed clean. She used an analogy of a baby growing to explain her perspective (Personal Communiqué, July 21, 2009). When you think about a person as they grow you remember them as they were at each stage of life. We don’t mix adult appearance and baby thinking. We keep mind pictures of appearance, thought and action frozen together and organize them chronologically.

Student number thirteen is a ten year and eight month old female. She does not qualify for any special services. Student number thirteen is a soft-spoken diligent student. She prefers to work and socialize with other girls that share her quiet demeanor. Student number thirteen increased her oral reading fluency from 17wcpm to 120wcpm while her accuracy remained at 98%. Her reading comprehension increased from sixteen to 23 questions correct. The areas of reading comprehension increase were: text structures and elements, relating ideas, and interpreting author’s views. Student number thirteen increased her writing from a rubric score of two to a score of 2.5. Student number thirteen increased her maths age from

9.34 to 9.36. Student number thirteen set clear goals for herself. In reading she wanted to improve two to three grade levels. In math she wanted to learn to “*-+ fractions with uncommon denomanators”. In “writing my goal is really SimPle it is to put lots of deatails in my StorieS” (Student Portfolio entry, July 2, 2009). Student number thirteen decided that striving for accuracy was the Habit of Mind that would best help her meet her goals. She intentionally used Thinking Maps® to help her find details in her reading and expresses her thoughts as the primary means of developing the Habit of Mind, striving for accuracy. She noted in her reflections that were recorded in her portfolio that creating Thinking Maps® helped her slow down and see ideas build. Thinking Maps® helped her check her work for accuracy and find ways she could improve. In conferences on July eight and 21, with the teacher-researcher, student number thirteen said that creating written Thinking Maps® helped her to prepare for group discussions and gave her more information to put in her writing. The teacher-researcher also noticed that her writing not only had more detail; it reflected more organization, stayed on a single topic, and began to reveal the student’s voice. In conferencing student number thirteen was asked to explain why she thought she was able to improve in so many areas. She said, “I strive for accuracy when I use Thinking Maps®. I never had good pictures of ideas before. Sometimes I use the same Thinking Map® to help me answer lots of questions. Oh, and I’m relaxed more. (Personal Communiqué, July 23, 2009)” Student number thirteen made clear metacognitive connections between her patterns of thought, Habits of Mind, and a useful tool in seeing and developing her thoughts, Thinking Maps®. She intentionally applied her newfound tool, Thinking Maps®, to as many situations as she could. Her spontaneous use of a powerful tool, Thinking Maps®, helped her develop her thinking, think about and analyze her thinking, and make intentional choices. Her choice

was continued development of her Habits of Mind. She used her academic progress as evidence of her own progress and personal success.

Student number fifteen is an eleven year and eleven month old male. He is receiving special education services outlined by an IEP for a specific learning disability. Student number fifteen often needs explicit direction before he participates and completes assignments. The work in his portfolio varies greatly in quality and completeness. His behavior also varies greatly. He typically exhibits model student behavior when he knows he is being watched by an adult and there is likely to be a negative consequence if he is not meeting behavioral expectations. The moment he thinks no adult is paying attention he seeks less academic activities. Some of the things he was caught doing when he thought the teacher-researcher was not watching were: passing notes that made fun of other students, throwing paper wads at classmates, chasing classmates and taunting them, and shredding paper. His mother worked with the teacher-researcher to help him build on his more constructive behaviors and realize the negative impacts of other choices. They worked to combine efforts and present clear expectations, consistent positive and negative consequences, in a united manner. Immediate consequences of time out, removal from recess activities, cleaning up messes he made, and informing his mother of his actions were consistently enforced. Student number fifteen missed two days. One day he chose to participate in a basketball tournament and the other he was excluded from the fieldtrip as a consequence for inappropriate behavior. Student number fifteen increased his oral reading fluency from 131wcpm to 133wcpm while decreasing his accuracy from 100% to 99%. Student number fifteen decreased his reading comprehension from eighteen to sixteen questions answered correctly. His writing improved from a rubric score of two to 2.5. Student number fifteen increased his maths age from 8.2 to 8.4. Student number fifteen offered little in the way of reflection during conferences or in his

portfolio. While he had goals of increasing his reading level by two grade levels, and scoring above grade level on his math he had no plan for achieving his goals. Even with prompting from the teacher-researcher he was unable to determine what skills, strategies, or behaviors might be helpful in achieving his goals. The teacher-researcher was left to speculate as to why this behavior was chosen by student number fifteen. Was he simply trying to avoid work and taking responsibility? Was he that unmotivated and simply didn't care? Was he searching for something in his life to control? Did he truly lack the skills or understanding of the relationships between his goals and behaviors? The teacher-researcher gained some clues as to the reasons for his behaviors through conferences about his behavior and listening to his comments while he was experiencing negative consequences for his behavior. Student number fifteen expressed a feeling of lack of control and responsibility. "Why? It don't matter anyway. You just gonna be mean anyway." "You just pick on boys. (Personal Communiqué, July 3-23, 2009)" These comments led the teacher-researcher to have daily conversations with student number fifteen that connected the student's positive actions with the teacher-researcher's encouragement and praise. The teacher-researcher was also intentional and consistent about connecting specific behaviors with punishments and taking great care to ensure that when a punishment was enforced, all involved received the same punishment. This required the teacher-researcher to be a detective on a regular basis. Keen observation, an observant paraprofessional, and a few careful decisions about seating arrangements were the basis of addressing the complaints of student number fifteen. Asking him and other students to voice their observations and perceptions was also part of the teacher-researcher's strategy to address the concern of student number fifteen.

Student number sixteen is a twelve year two month old female. She qualifies for English language acquisition services. Student number sixteen has the following academic

goals.

Reading: moving up 3 more levels and going up with AR Points.

Writing: spelling better, making the sentence right.

Math: getting better learning more about fractions (Student Portfolio entry, July 1, 2009)

When asked what she would do to meet her goals student number sixteen replied, “I do what teacher tells me. (Personal Communiqué, July 1, 2009)” Student number sixteen is outgoing and highly socially focused. She frequently attempts to get those around her to smile and laugh. This is frequently a distraction from academic tasks and expected behavior. When asked to explain or stop her distracting behavior she apologizes, smiles, and meets the expectations of the adult for a time. She required several redirections each day. One day while walking out to recess with the teacher-researcher she began a conversation about her distracting behavior. She referred to herself as “noisy” and asked “Do I drive you crazy, ‘cauz my teachers and sometimes my Mom say I drive them crazy. (Personal Communique, July 8, 2009)” After laughing several students joined in an informal discussion about distracting behavior. They all said they could be bothersome and tried not to drive others crazy. The students shared that when student number sixteen was beginning to drive them crazy they could tell her and she would go away and bother another person. The students wanted to know what student number sixteen did to control her urges to talk with others when she should be working and how she ever got any work done when she talked so much. The conversation ended as the class got sight of the playground. Later in conferences the teacher-researcher asked her to share her strategies for managing her impulsivity. Due to her limited English proficiency she had difficulty expressing herself and required explicit language assistance while conferencing. Student number sixteen stated that keeping her eyes on her work and making space around her were the first things she did when she wanted to focus.

She said singing to herself was what worked the best. If she set time limits for parts of the task she spent more time watching the clock than working and her work was usually not readable then. Student number sixteen said that the volume of noise and the activity level of the room made a big difference in her ability to focus. If it was too noisy she could not hear herself. If it was too quiet she worried about her own noise. If no one was moving around she felt she could not breathe or move. If several people were moving a lot she watched them. The teacher-researcher addressed the situation by being sure that the groups she worked and sat with were comfortable with her quietly singing to herself and that they wiggled around a bit when working. Frequently the teacher-researcher assigned tasks that required movement and conversation. Student number sixteen increased her reading fluency from 97wcpm to 114 wcpm and remains below the 125-135 wcpm fifth grade target. Student number sixteen decreased her accuracy from 100% to 98% of the words attempted were read correctly. Student number sixteen decreased in reading comprehension from sixteen to fourteen questions answered correctly. Student number sixteen increased her maths age from 9.2 to 9.31. Student number sixteen used the help function in the Math Whizz program in most lessons. She said the help it gave her did help her understand what to do for that question. The help was difficult for her to apply to other questions and lessons. Student number sixteen consistently scored a two on the writing assessments. Student number sixteen stated that she liked to make Double-bubble maps because they were easy and helped her find information in a text and organize it. She shared that keeping everything she read in her head was difficult and that Thinking Maps® made it easier because she didn't have to worry about remembering. She liked to focus on understanding not both understanding and remembering. The teacher-researcher noticed that content specific words

were more frequent in her work at the end of the program than at the beginning. Student number sixteen was also observed using more academic language in her conversation and when asking questions. At the beginning of the program she would shrug her shoulders and say, "I don't know" when she was not aware of a specific word or concept and leave her Thinking Maps® blank. As the program progressed she began focusing her conversation in-group projects on the language needed to complete her Thinking Maps®. This change in behavior was both encouraged and spontaneous. Student number sixteen continued these conversations after assignments were completed and was observed at recess practicing new vocabulary. The patterns of persistence and managing impulsivity were clearly being established. The focus on the Habits of Mind, striving for accuracy and thinking and communicating with clarity and precision, appear to be the measuring stick of progress for student number sixteen.

Student number eighteen is an eleven year and one month old male. He has an IEP and qualifies for special education services due to a specific learning disability. Student number eighteen does not attend the elementary that most of the participants attend. This student had perfect attendance. Student number eighteen served as a role model and critical friend to student number nine. Student number eighteen diligently completes his assignments and is tentative about asking for assistance or clarification. Student number eighteen has limited academic vocabulary and benefits from intentional vocabulary instruction. Student number eighteen increased his reading fluency from 111wcpm to 129wcpm and his accuracy from 97% to 100% of the words attempted were read correctly. The reading comprehension scores of student number eighteen increased from eighteen to 22 questions answered correctly. Increases were in the areas of: text structure and elements, making judgments, and

word families and structures. His writing improved from a rubric score of two to a score of 2.5. Student number eighteen's math age went from 10.09 to 10.15. These test scores describe a student functioning consistently at the early fifth grade level. The clean organized assignments completed consistently by student number eleven are evidence of several established Habits of Mind: Persistence, managing impulsivity, striving for accuracy, thinking and communicating with clarity and accuracy. Student number eighteen shared the following written goals at the beginning of the program.

my reading goal is to read 1000 mins!

my math goal is to hey every single math promble.

my writing goal is to write about epic battles. (Student Portfolio Entry, July 1, 2009)

Student number eighteen stated that he would use the following strategies to meet his goals: stay on focus, make a schedule and have his mom help him follow it, and pay attention in class (Personal Communiqué, July 1, 2009). This summer program was the first experience with Thinking Maps®. In a reflection in his portfolio the student responded to a writing prompt: In what ways have Thinking Maps® helped you?

What way have Thinking help you?

One whay is it maKe neat Writing.

second way it can maKe you under Stand.

Third it can maKe it useFul.

Forth it can maKe it better For you.

Fith way it can help you on detail.

Six way it can help you learn more.

sven it can help the teacher under-stand what you are doing and help the teacher.

(Student Portfolio Entry, July 21, 2009)

This particular portfolio entry caught the teacher-researcher's eye for several reasons. The first reason is the overall structure of the writing. The reason this caught the teacher-researcher's eye is that there was no structure offered or encouraged for this writing. The use of order words suggested that the student had extensive training in the use of a formula for writing procedures and was attempting to use his training in this situation. The pattern of using formulaic writing was evident in most of the writing student number eighteen completed. This writing as an isolated entry sounded like the student was coached to respond in this way. This was not the case. The prompt was repeated in several forms both oral and written at several times during the summer program. This response was a later response and actually reflects a cumulative reflection of the effects that Thinking Maps® were perceived to have on this student. The response so intrigued the teacher-researcher that she used the entry as the topic of two conference times with this student and several informal conversations during his work time. The student elaborated on each one of the seven items listed in his response. Student number eighteen credited Thinking Maps® with giving him choice and structure in his writing. He indeed was relying on memorized formulas when writing and struggled to determine when to use each one. Generally he relied on a model, direction, or recent instruction to decide which formula to use in his writing. He was confused when the teacher-researcher did not offer a formula for good writing and instead focused on content and structure of writing using a variety of Thinking Maps®. He found this change in instruction to increase his understanding and be a good way to communicate with teacher and others without too many words. He found it useful for identifying the concepts and specific vocabulary needed to express his ideas. Student number eighteen found Thinking Maps® to

be an effective way to collaboratively build his understanding and communication skills. It was through his use of Thinking Maps® that student number eighteen intentionally developed several Habits of Mind. He used Thinking Maps® to strive for accuracy and think and communicate with clarity and precision. The use of Thinking Maps® made his thought patterns visible so he could think interdependently and improve his accuracy in communication.

Student number twenty is a twelve year and three month male. He qualifies for special services in English Acquisition. Student number twenty had perfect attendance. Student number twenty increased his reading fluency from 92wcpm to 114wcpm and his accuracy from 91% to 99% of the words attempted were read correctly. His reading comprehension improved from eight questions correct to thirteen questions correct. His greatest gains were in the areas of: text structure and elements, relating ideas, inferences and conclusions, and interpreting author's views. Student number twenty maintained a rubric score of two on his writing. Student number twenty maintained his maths age at 8.27. Student number twenty set goals for reading, writing and math. He wanted to read more, "write more to lorn mor englash", and "lorn more about fractions.(Student Portfolio Entry, July 1, 2009)" Student number twenty was unsurpassed in his enthusiasm for learning and gaining positive adult attention. His was always the first hand up to answer a question or volunteer for anything, even when he did not know what was being asked. He struggled to complete most assignments and found Thinking Maps® to be quite challenging. The first map he made based on a text in the summer program was a Double bubble map comparing and contrasting two animals. He read the text quickly and eagerly placed information on the page. He quickly called the teacher-researcher over to proudly show off his work. The teacher-researcher

asked him to tell her about the Double bubble map and he began sharing many disconnected pieces of information from the text and from his prior knowledge. The teacher-researcher reviewed the directions for the assignment with him and his group. She helped them all pick their animals, one fact from the text about each animal, and begin the correct formation of their Double bubble maps. Once they had a correct foundation they became very focused and animated as they built their unique maps together. After they had been working for about five minutes the teacher-researcher checked in with them and student number twenty said, "Now I know why you call them Thinking maps. They show your ideas." Student number seven said, "it's like a map of my brain, but just a part." (Personal communiqué, July 13, 2009)" Student number twenty shared in conferences that Thinking Maps® were the tool he used to improve his comprehension and academic English vocabulary. He said that Thinking Maps® helped him ask questions and get help when he didn't know the words to use. During the final day of class student number twenty was noticeably excited and voluntarily used Habits of Mind. While walking around and observing the animals, he was attempting to read signs and asked several others to read with him. He would listen to the other person and join in when he was confident. One sign in front of an exhibit of bobcats had pictures of several types of cat ears and explained the purpose of each type. Student number twenty stopped reading partway through the second description and said "Oh, it's a double bubble. They are everywhere. (Personal Communiqué, July 24, 2009)" After the teacher-researcher stopped laughing she asked him to explain. Student number twenty said that the sign compared many ears and he liked dog ears. The teacher-researcher inquired about other places he saw double-bubble maps. He said that you always compare things and tests had lots of questions about different and same. While on a tram ride through the open area student number seven was sitting with

student number twenty. Both students were excited and pointing to animals and their surroundings. They asked for the English names of the animals, land formations, and plant life. This was an example of the motivating force emotion can play in learning. It is also evidence of the stimulating nature of the field trip location. After about ten minutes of Gathering data through their senses, managing their impulsivity, striving for accuracy, and persisting the students began to shift their actions slightly. They took responsible risks and communicated with more precision and clarity by using the English words for more things around them. This led to applying past knowledge to new situations and metacognition in an expression of wonder and awe. As the tram rounded a corner the students saw a wetland area with several birds, small animals, and different plant life. Student number twenty gasped, pointed, and said “I know what that is...It’s a ...what do you call it...ahhh....ahhh....” Student number seven exclaims “A habitat.” Student number twenty shouts, “Yeah, Yeah, I know...A habitat. A wetland habitat. See it’s got animals, food, water, home. (Personal Communiqué, July 24, 2009)” The teacher-researcher, in great anticipation and while grinning with pride, asked how do you know that? Both students responded in unison, “cauz we read it. I did a Double- Bubble and a parts map. (Personal Communiqué, July 24, 2009)” The interdependent thinking expressed by these two students was definitely a habit. From the very beginning of the program students seven and twenty tried to manipulate their environment so that they could work together. They chose seats near each other, stood in line together, played at recess together, and shared lunches. Their constant proximity to one another had enabled them to anticipate the needs and actions of the other. They had developed a friendship with an equal balance of power that offered them security and encouraged personal growth. Academic orientated expressions of this reciprocal and interdependent thinking were common in the classroom. They explained words and directions

to one another, sometimes in English and sometimes not. They offered suggestions for improving each other's assignments. They came together and asked questions to ensure that both of them had a clear understanding. When asked independently why they did these things both students responded by saying they did better work and it was easier when they worked together. They also expressed that they helped each other do their own work and made sure that both of them had good and different work. On several occasions the teacher-researcher observed these two boys including others in their work together. The teacher-researcher praised their collaborative efforts and publicly acknowledged their efforts.

Question 1 – Student Behavior

When a teacher uses Thinking Maps® to review academic content with students and as a tool to help students determine what they know, determine what they don't know, make connections to other academic content, make connections to real life, and set personal learning goals consistently in multiple contexts; do students show evidence of developing Habits of Mind?

In the first few days of the program the teacher-researcher identified three Habits of Mind as a class focus: managing impulsivity, persistence, and striving for accuracy. The teacher-researcher observed student behavior, analyzed student scores, and to choose the focused Habits of Mind. Students frequently; blurted out, did not work on an academic task long enough to finish it or finished it so quickly that quality suffered, and engaged in social conversation instead of academic conversation. Student test scores revealed a lack of attention to detail and stamina. The teacher-researcher used the overall class patterns as starting point for a discussion about the relationship between behavior and performance.

Specific classroom behaviors were identified by the class and by the teacher-researcher as indicative of impulse control and adopted as classroom norms. Raising a hand, staying in your seat or with a designated group while working, self-monitoring of voice level, on topic conversation, following directions the first time, and completing routines without redirection are some of the examples this student group identified as managing impulsivity. None of these expectations were new to the students and there was consensus that these behaviors were necessary to complete quality work together.

Through discussion with the teacher-researcher the class expounded on their experiences. Seeing the structure of their thought on the page was a profoundly eye opening experience. Students that were familiar with Thinking Maps® before working with this

teacher-researcher found the addition of discussing and revising maps to be sobering and motivating. Since these students were performing below grade level and generally had poor work and study habits; the awareness of specific deficits and a concrete tool for self-help was empowering and motivating. When the class was asked how Thinking Maps® had helped them develop the Habit of Mind, striving for accuracy, eleven of the twelve students responded with increased specific vocabulary and a better understanding of their own thought. This awareness was the beginning of student construction of personal understanding.

As the students began to understand the structure and function of the Thinking Maps® they created they began to own their thinking and stopped asking the teacher to provide answers. They began to develop other Habits of Mind, taking responsible risks and gathering data through all senses. Students reviewed assignment directions with little or no prompting and developed a hypothesis in regards to the assignment, using metacognition, instead of doing nothing or making random guesses. Students began asking for confirmation or refinement of their interpretations instead of detailed directives from the teacher.

During the first days of the summer program, several students would avoid completing assignments. Common avoidance tactics were: erasing and starting over, crumpling paper and throwing it away, socializing, and scribbling on the page. On day five of the summer program the teacher-researcher made a shocking observation. Every student calmly and to the best of their abilities completed every academic task that day. Students asked questions to clarify expectations and the use of Thinking Maps®. Students demonstrated emotional engagement when commenting that the work was difficult and persistence when they kept working.

Day five appeared to be a turning point in terms student perceptions. There was a noticeable general calming and intense shift in student focus. Students began to voluntarily discuss academic topics more frequently. This researcher noticed student behavior and conversation was focused on rules and routines. When they were followed, student behavior was calm and body language signaled a relaxed state. When routines and expectations were disrupted tension resulted. Students lost focus on the task at hand and unwanted behaviors increased.

This researcher contends that the structure of workshop and Thinking Maps reduced student anxiety. Students perceived that academic success was suddenly possible. Several students in several conferences expressed their appreciation of structured and clarified thinking through the use of Thinking Maps.

When combined with self-reflection and personal accountability student anxiety was further reduced. Conferences in which student performance and goals were discussed gave students individual focus. The non-judgmental stance of the teacher-researcher further reduced student anxiety. The open communication about routines and teacher encouragement of students to share their opinions and perceptions in a variety of formats empowered students. The end result was an environment where students perceived that they were valued, heard, and had real control over their situation. It happened quickly with this group of students due to their previous experiences with the teacher researcher. Many students formed their perceptions before the summer program and merely refined and tested them.

By day ten assignments were actually completed within expected timeframes, with minimal adult encouragement, and consistently showed an accurate picture of student abilities. It was at this point that students had completed their initial testing of the teacher and

paraprofessional. They had proven that they were observant, consistent, and responsive. The honeymoon phase had begun. Following through on schedules and planned activities was critical. Immediately addressing student concerns was a priority. Every action of the teacher and paraprofessional was explained to students. Sometimes that explanation was vague because sharing of details with students was not appropriate. The willingness of the adults to openly listen to and acknowledge student concerns and discuss, at least in part, their actions, demonstrated their commitment to meeting the needs of students. It sent the message that students were valued and while they had control of some things, there were things out of their control. It further modeled for students the appropriate manner in which to handle things that are out of your control or confidential.

Consistent routines with clear directions were evident throughout each day of the summer program. Students were expected to independently complete a set of entry tasks each morning. The first five days of the program were spent ensuring that the students understood the routines and possessed the skills necessary to complete the tasks. Students were asked to state the expectation, if they needed assistance completing the expectation, and demonstrate the routine or expectation. Scaffolds such as written procedures and work buddies enabled all students to complete all routines and fulfill each expectation within the first four days of the program.

Consistency was the focus beginning on day five. Students responded with increased success each day with the exception of two students. Two male students began to struggle meeting social behavior expectations in the last week of the program. The teacher-researcher and paraprofessional worked together to identify the conflict and support more constructive behavioral choices. The male students responded by complying with behavioral expectations in adult guided activities and by becoming more covert in their actions. Due to the brief time

period of the research project many questions remain unanswered about this conflict.

The area of greatest improvement in class scores was in the area of text structures in reading comprehension and the overall structure of their writing. Students were better able to identify and create mental structures of ideas after creating them in a nonlinear visual form. Even when Thinking Maps® were begun and not completed, students still benefited from the mental processing of identifying specific thought processes and a visual representation of that structure. Students expressed appreciation that using Thinking Maps® did not require them to write a lot to express their thoughts. The ability to use multiple languages and illustrations to identify and organize their thoughts enabled the students to easily ask for assistance with specific English vocabulary and structure of sentences as well as missing information.

Using guided discussion and feedback in small groups as a way to practice and expand their use of academic English was appreciated by the students. Students used the time set aside for small group work eagerly. Students asked intentional and specific questions that helped them improve their work. Students sought out the assistance of the teacher-researcher to carefully construct questions and question stems. With this scaffolded instruction these struggling learners found the tools, security, and motivation to develop their Habits of Mind.

The teacher-researcher encouraged the students to use mental Thinking Maps® to develop reasoning when disagreements arose on the playground. Comparing and contrasting the perspectives of two individuals arguing about the rules of foursquare was often all that was needed to settle an argument that was quickly headed for the physical realm. Toward the end of the program this problem solving strategy was demonstrated as an unsolicited routine.

On day thirteen of the program the foursquare court suddenly erupted in screaming,

pointing and flailing arms. Concerned that this group of male students appeared to be preparing to physically express their disapproval; the teacher-researcher walked over and investigated hoping that her presence would clam the waves of emotion and enable a rational conversation to occur. Just as she arrived, student number twenty said “OK, OK, OK, Now make a bubble of out.(Personal Communiqué, July 16, 2009)” Each player shouted his or her descriptions of what it looks like to get out of the game. The teacher-researcher listened to the descriptions and discovered that the core of the disagreement was exactly how much of the ball had to hit on the line for it to be considered out of play. It was at this point that the teacher-researcher entered the conversation and the game. She took turns with each player making the ball come close to or touch the line. All players called out “in” or “out”. After this practice applying the definition to the actual event, there were far fewer disagreements about where the ball hit and who was “out.” This was an example of how the students used Thinking Maps® to develop a common definition that was put into practical use. They used the Habit of Mind, Listening with understanding and empathy and then went on to apply the knowledge to a new situation in which striving for accuracy was a critical factor.

Building an open and honest relationship with each student was critical since these students see everything as personal. The teacher-researcher knew the home situation of each student before the program began and had worked with many of the students during the regular school year. Individually, many students in this group chose to complete assignments and work cooperatively only under certain conditions. They refused to work for certain adults. The teacher-researcher and paraprofessional knew a few critical things about this group of individual students that they intentionally put to use. The student must feel that the adult listens to each student. The adult in charge must give clear and consistent responses that are

followed with minimal difficulty. The adult's actions must be perceived as fair. The student must perceive that the adult likes all students equally. The student must perceive that the adult will respond promptly and constructively at all times, especially when the student feels threatened. Since all things are personal and rapport comes before work the teacher-researcher set out to get real with these students.

The first step in rapport building was getting to know each other. Due the short timeframe of the research project the teacher-researcher had to be creative. Trust was established through clear and consistent communication. Safety was the primary reason for teacher imposed rules and consistent punishment was immediate. This established the boundaries within which the program operated.

Respect was the next building block put into place. This was done through student involvement in setting routines and expectations. As members of the group the teacher-researcher and paraprofessional contributed to the conversation. They both explained reasons for expectations or routines that were not a choice and asked for compliance. Once student questions were answered and student feedback incorporated, the entire group agreed to comply. When a student had difficulty he or she was reminded of the agreement and consequence. That was generally enough redirection for the student to return focus to constructive behaviors.

The teacher-researcher and paraprofessional were fortunate to already have established relationships with most of the students and encouraged them to share their experiences when opportunities arose. Personal anecdotes often found their way into instruction, conferences, and discussions. Humor was intentionally used to support constructive behavior and reduce anxiety. Thinking aloud was a strategy used by the teacher

and combined with the use of Thinking Maps® to ensure student understanding.

Conferences provided an opportunity for the teacher-researcher to demonstrate her interest and desire to support each student. Conferences were predictable, goal directed, student focused, and constructive. Each conference required the student to provide written work or a personal reflection about how the work was completed. Discussion was focused on indicators of student progress, lack of progress, habits or skills that would improve progress, and a plan to achieve progress. Conferences also provided a structure for gaining information needed to build a scaffold of instruction and experiences that would lead to student success. The teacher-researcher would ask questions, provide resources and encouragement, and give students choice in reaching for their goals.

Listening was another way in which the teacher-researcher intentionally built a foundation of mutual respect with students. Often when guiding a small group in discussion the teacher researcher would only speak when the group requested assistance or was in obvious need of assistance. Often the teacher-researcher's participation was in the form of asking a question to the group and quietly listening to the group responses. She would often drift in and out of groups while they worked. Many times her only input to the group was a smile or wink. When a student was speaking the teacher-researcher demonstrated the same behavior she expected from her students. She did not interrupt the student in the middle of the story. She focused her attention on the student and generally repeated a part of what the student said. When it was not possible to focus her attention on one student the teacher researcher apologized and often asked for the student to wait or repeat what was being shared. Some students would begin a personal story one morning and patiently wait until recess or lunch to finish.

The silence of the teacher-researcher provided time for students to think and offer rich responses. Often after asking a question the teacher-researcher would ask the group to be quiet for a full minute before anyone could speak. Before inviting responses she would ask, "Does anyone need more thinking time?" More students responded with on topic and thoughtful responses when this technique was used than when students immediately blurted out a response. In conferences, when silence was extended, students gave responses that were worthy of recording and many became part of this research paper. Repeating the same questions over the course of the summer program had a similar result with the added benefit of seeing the thoughts of each student develop. Early answers to questions about Habits of Mind and the use of Thinking Maps® were met with little response. Later responses reflected increased understanding, practice, and metacognitive analysis.

The Habits of Mind clusters

This teacher-researcher found some patterns in the development of the Habits of Mind in this group of students. A pattern of clustering or grouping of Habits of Mind (see appendix D) in specific students at specific times was noticed. The researcher noticed that the students with the lowest academic or behavioral performance clearly displayed a similar set of Habits of Mind and based these behaviors on a common “I can’t” perception of themselves. They resisted or appeared to be unfamiliar with other Habits of Mind. The teacher researcher has labeled this group of initially displayed Habits of Mind as awareness. The second group of Habits of Mind was displayed by students who wanted to “get the right answer” and was somewhat curious about how to derive “right answers”. The researcher labeled this group experimentation. The third group of Habits of Mind was displayed by students that were seeking understanding and patterns that that they then used to make sense of their world and complete academic tasks. The researcher labeled this group of Habits of Mind practice. Students that approach academic tasks with confidence and basic competence displayed the last group of Habits of Mind. The researcher labeled this grouping of Habits of Mind as fluency. One Habit of Mind had a unique relationship to each grouping of the Habits of Mind. Metacognition was repeatedly identified as the reason students explored and displayed more proficient use of the Habits of Mind. Consistently students used Thinking Maps® as the tool to identify and develop their metacognition.

While the Habits of Mind are not hierarchical they are developmental. Each Habit evolves as the person grows. If a person stagnates in their development so too do the Habits of Mind. What this researcher observed was that students with significantly similar age or grade level performance in a specific routine classroom or social situation shared a common behavior pattern that could be described in terms of a collection of Habits of Mind. Students

could move from group to group based on their background and previous experiences with the specific task or situation.

Students in the first grouping, awareness, displayed primarily three Habits of Mind: persisting, managing impulsivity, and gathering data. These students all resisted completing assigned academic tasks and had difficulty functioning in the specific social setting. Each student in this category identified as a goal and required significant assistance developing the Habit of Mind, managing impulsivity. They were aware of what was going on around them and often saw little connection between their actions and those of others. The use of Thinking Maps® to compare and contrast their actions and identify cause and effect relationships between the actions of individuals was identified by the students as helpful in choosing behaviors and changing perspectives that empowered them to develop these and other Habits of Mind. Two students began the summer program functioning primarily in this grouping. The students resisted completing any academic task and had few constructive social interactions.

The second grouping is experimentation. It is the mindset that the individual has some influence and can interact with their environment that typified these students. Students in this stage had some intentionality to their actions. They sought to identify missing information and confirm their perspective as the “right” one. Their risk taking was focused on asking questions to solicit specific information that fits into their perspectives. They were more aware of their surroundings and used more situational data to form mental models. They listened to others for the purpose of increasing their own communication and understanding.

The third grouping is practice because it is this group that is intentional about building their capacity for Habits of Mind and sought to make intentional growth through personal

effort. When functioning with this group of Habits of Mind, students were often displaying model student behavior. Students went beyond what was required of them to gain basic proficiency and demonstrated consistent, comprehensive, or depth of understanding. These students were comfortable with the content or situation and looked for ways to connect their knowledge to other situations or concepts. They began to enjoy their work in this grouping of Habits of Mind.

The last grouping of the Habits of Mind is fluency. When students used this grouping they tried to play with the content or situation. Analogous thinking was often the source of their unique connections and perspectives. This grouping required the student to be confident and relaxed. The content and situation had to have familiar, novel, and engaging elements.

This researcher was reminded of a personal perspective on the power of simplicity. It was through the simple, student friendly explanations that both researcher and student turned information into meaningful knowledge. As researcher and student worked together to clearly define and practice Habits of Mind and use Thinking Maps® we experienced many “I got it” moments. The simplicity of each primitive form of Thinking Map® laid a framework that insisted on clarity and focus in our thought. It was the simplicity of Thinking Maps® that enabled us to quickly apply and refine our thinking, sometimes with great complexity and insight. As a researcher Thinking Maps® had a profound impact on the clarity of thought that could be presented and analyzed. It was through several revisions of multiple Thinking Maps® that findings and evidence of this dissertation were organized into this present form.

The educational objectives used by the teacher-researcher influenced the classroom environment and personal growth of individual students. The teacher researcher intentionally and routinely included educational objectives within the metacognitive dimension. These

objectives were compound and contained one or more cognitive processes (Anderson & Krathwohl, 2001). Students frequently displayed facial expressions that alerted the teacher researcher of the novelty and challenge the objectives presented. The teacher-researcher took on the role of a cheerleader as they made their first attempts. Asking questions that would lead students to identify inconsistencies in their work was done while offering praise and encouragement. Here is an example of an objective from a literacy lesson. “Read chapter one and create a Tree Map (Categorize) of habitats and the related information about each type of habitat, share your work with a partner. (Olson, July 9, 2009).” At first glance this seems like a simple direction for a task. Let’s break this down using the revised taxonomy (Anderson & Krathwohl, 2001). The student is first asked to read. This teacher-researcher encouraged students to choose how they read (alone, with a partner, in a group, silently, whispering...). This required the students to know something about themselves as learners and take responsibility for their own learning behavior. Students were empowered to make choices for themselves and self-evaluate the effectiveness of their choices. Students were accountable for applying their reading skills and engage in both conceptual knowledge of reading and the content of what was being read. The creation of a Thinking Map® comprised of the content of the reading engaged the students in multiple ways. The structure of the text was illuminated to the student. Frequently in the midst of these activities students would blurt out “OOHHHH, I get it.” and then begin writing. This brought the facts and concepts from the text into a metacognitive context. The cognitive processes were also brought into the metacognitive context. A student had to remember, understand, apply, analyze, evaluate, and create while making the Thinking Map®. Therefore, the dimension that drew all others into itself is the metacognitive. Within the metacognitive dimension all other dimensions of the

new taxonomy were accessed and made personally meaningful.

Question 2 – Student Work Samples

When a teacher spends proportionally more instructional time on constructivist activities using Thinking Maps® and proportionally less time on teacher directed lecture, what evidence of critical thinking and Habits of Mind become evident in student work?

The use of the workshop model of instruction gave a consistent structure that focused attention on student performance. The workshop model of instruction is a framework for structuring instructional time and activities. Whole class instruction is confined to ten-minute chunks. Student work time comprises the majority of the instructional time. Work time has several components. Individual work, group work, teacher guided group work focused on skill building, and student teacher conferences are the components that occur during work time. The underlying expectation of students required for success in the workshop model is self-management. Students must know and follow routines independently. The teacher researcher made this expectation clear to the class and encouraged the use of Habits of Mind and Thinking Maps® to support constructive student engagement.

The teacher-researcher used Thinking Maps® to record the class discussions. Students referred to the shared maps and added to them as situations presented themselves. Evidence that this specific instructional technique aided the students in developing Habits of Mind were plentiful and followed the example of the teacher-researcher. Students frequently referred to the Thinking Maps® in discussion. Students reminded each other of the need for better impulse control by referring to the Thinking Maps® made by the class. Impromptu small group discussions about participation and other expected classroom behaviors were often settled by referring to the Thinking Maps® made by the class. Open discussion about the impact of student choices of behavior was a powerful behavior management tool. Student behavior was identified, the impact was identified and the student was asked if the end result

of the behavior was what the student wanted. Several options of alternative behavior were offered as well as constructive strategies. The choice remained with the student.

Each assignment completed by the students reflected deeper understanding and expression of student thought. Student language became more specific and detailed. Student work contained increased development of thought patterns as the program progressed. At the beginning of the program students gave no response or a single example on most assignments. By the end of the program student work reflected several points of a single thinking process. When asked to describe in an assignment students began with vague statements with little or no supporting details. At the end of the program student work involving description included three or more unique points elaborated with clear detail.

Several students stated that identifying the type of thinking that needed to be done made completing assignments and understanding content easier. The intentional analysis of a single thinking process at a time helped the students clarify and organize their thinking. The ability to share their thinking visually with little effort made offering and requesting feedback relatively easy.

Student number six summarized well the experiences common to most students in this summer program. She tried and found to be helpful in the summer program were the use of Thinking Maps® and the use of Habits of Mind. She frequently mentioned that persistence and managing impulsivity were where she started. Then she tried to figure out what to do by listening with understanding and empathy, applying past knowledge to new situations, and thinking about her thinking. The next thing she routinely did was plan. She would make a Thinking Map® on her paper or in her head. Her last step she saw was doing the task. She later added that she checked her work or her thinking by asking herself "Did it work?" This

student beautifully outlined for the teacher-researcher the pattern seen in the class as a whole in varying levels of progression and intentionality.

The immediate simple and practical applications of Thinking Maps® and Habits of Mind across all content and situations demonstrated their value to students. Few individuals desire to seek out and routinely apply complicated concepts. Most individuals desire routines in daily life to be simple, easy to apply. If processes or products are hard to use, they don't get used. Since students were able to quickly and easily grasp the concepts behind both Thinking Maps® and Habits of Mind they were willing to test the ideas. When students saw these two tools as helpful they readily used them. As their use and understanding increased, students found new contexts to use the tools. The ease in which the tools were applied to new concepts and situations was the real beauty and power discovered by the students. Having a single set of multiuse tools made focus on student performance unavoidable.

The constant discussion and application of these tools was necessary for adequate development. Students needed to be constantly encouraged and supported in their exploration and use of these tools. Frequent reflection on their use and effects increased understanding and built a peer support network. The common experiences with the tools and classmates gave students a context in which to explore and test practical applications.

Learning is a complex process. It is not limited to knowing stuff. Learning involves a personal interaction with content and its application. The constructivist practice of creating opportunities for students to explore and connect with interesting content was a successful strategy used in this research project. Supporting and guiding student exploration through the use of Thinking Maps®, Habits of Mind, questioning to promote personal meaning, the structure of the workshop model combined to create an environment in which these struggling

learners made significant progress in several areas. This constructivist based learning environment can be used at any grade level and with any content area. With a focus on student responsibility and teacher support of student goals, competence with academic standards was improved.

This researcher noted some interesting patterns in student responses to questions about academic growth strategies. When asked how academic growth was achieved no student responded with memorization or increased understanding of content as a reason for academic growth. All students attributed their academic growth to a change in their behavior. In early conferences students overwhelmingly responded with increased persistence, management of impulsivity, and striving for accuracy as the cause of increased academic performance. In later conferences students shifted their answers to the use of specific Thinking Maps® and taking responsible risks. From this pattern this researcher concluded that the intentional teaching of Habits of Mind and Thinking Maps® was a significantly more effective method of promoting student performance than content only instruction. When the teacher researcher gave the students content specific information, such as the difference between an adjective and an adverb, students rarely were able to use information without the support behavioral context. Students would often respond with a blank stare or inaction until the use of the academic information was put into a practical behavioral context. When students made Double Bubble maps comparing and contrasting adjectives and adverbs and then added adjectives and adverbs to their writing; students suddenly successfully applied the academic information. The academically constructive behaviors of Habits of Mind combined with the visual language of thought that comprises Thinking Maps® provided the necessary structure these struggling students needed for academic success.

In order for students to assist students in the construction of meaningful knowledge from academic information the teacher-researcher used questioning strategies combined with explicit language when interacting with students. While asking students to explain or share their work with her, she frequently discovered the source of a student's academic difficulty. The teacher-researcher used questions to help students develop and reconstruct their understanding of academic concepts. Identification of misconceptions and incomplete concept development were brought out and corrected through asking students to make comparisons of their work to other examples. The teacher-researcher often referred students to specific concise resources to aid in the construction of academic concepts. She returned and confirmed, through further open-ended questioning and careful analysis of student work, that the information was understood and applied accurately.

Knowing what question to ask and when to ask is a difficult scientific art to perfect. The questioner must not assume more or less than the person being questioned. The questioner must ask questions in a way that helps the person being questioned to articulate a clear and complete picture of their thought process. The questioner must keep in mind that the focus of the conversation is to better understand the other person and not to share his or her own knowledge. Questions must be phrased in a manner that encourages the other person to share and be explicit. It is the task of the questioner to identify the framework held within the mind of the other and compare it with a solid understanding of academic content. When an inconsistency is noted, the questioner then poses a question or offers a model that will highlight the inconsistency. It is then the job of the person being questioned to grapple with the inconsistency.

When instructional language is explicit communication is clearer. Explicit language also helps students develop academic vocabulary. When students hear and are expected to use

content specific vocabulary they see the usefulness of being specific and attempt to be more specific themselves. When teacher and students focus on developing the habit of using academic vocabulary and communicating details clearly they are working to develop the Habits of Mind: metacognition, striving for accuracy, thinking and communicating with clarity and precision, while they remain open to new learning.

Implications

The professional audience may be afforded many potential benefits from this study. The most significant benefit to educators and administrators is a clear picture of how constructivist practices can fit together in a highly diverse classroom. Teachers have a tremendous challenge managing the number of responsibilities and tasks that need to be completed each day.

Validation of the effectiveness of visual tools, specific instruction in academic behavior, increased awareness of thinking patterns and their effects are significant benefits to both students and educators. The greatest impact on student learning was the development of a personal metacognitive frame through reflection. Students began to show academic growth as they became more aware of their own thinking and began to test their interpretations. The teacher researcher used both Habits of Mind and Thinking Maps® as a scaffold to assist students in the development of a metacognitive frame. The metacognitive frame gave meaning to the content and context. Students found a reason to attend, remember, review, and improve their skills when the personal metacognitive frame was part of each learning objective.

In the creation of academic objectives in the lessons created for this research project the researcher noted that her objectives were quite complex. Content objectives contained three elements; content, thinking behavior, and metacognition. In the revised taxonomy there are two domains: content and process. Within the process domain is metacognition. This researcher treated metacognition as a domain in and of itself. As part of each content area each day the objectives contained an expression of metacognition. Thinking Maps® were generally used to express the content, the thought process, and serve as a common visual

language. The sharing of Thinking Maps® and collaborative revisions became a routine for metacognitive development. Questioning strategies that sparked curiosity and encouraged metacognition also presupposed self-evaluation and pursuit of personal goals.

This research project has provided examples of efficient ways to combine tasks and keep academic goals as the focal point, even when on the playground. The perspective and practices in this research can be applied to any content, curriculum, age group, language group, ethnic group, or other population. The reality of classrooms today is that they are increasingly diverse in many ways and teachers need a practical and effective way to ensure each individual student is successful. The days of teaching to the middle or the majority of students are gone. Today we teach unique and multifaceted individuals. The uniqueness of each individual and their skill in being self-regulating in a collaborative environment are and will become even more critical keys to success. This research project offers a coherent and practical way for teachers to positively impact student academic and social success. The realistic and practical application of these theories is the unique aspect of this research project. Current research focuses on identification and impact of these theories. This research project sought to combine these researched practices into a manageable and effective teaching routine that positively impacted student performance and provided students with tools that can be used to enhance any stage of learning.

The students were in contact with the teacher-researcher generally four days a week from nine in the morning to twelve-thirty, a total of three and a half hours. Not all of this time was focused on academics. Recess, Lunch, and transitions were also a part of the daily routine. The Math Whizz program was entirely website based and the teacher-researcher took on a supervisory or guidance role at that time. The remaining time was planned by the

teacher-researcher. The largest part of each day was spent with students interacting with content and conferencing. Teacher-researcher time spent intentionally teaching Thinking Maps® consisted of about five minutes a day of classroom instruction and an hour reviewing student work and offering feedback as maps were constructed. Thinking Maps® were intentionally integrated into most content lessons and referred to as guides for instruction and discussion. Discussions and behavioral expectations during student work time had two goals: academic content, and development of Habits of Mind. Thinking Maps® served as the common language to express and develop both academic and behavioral goals. The reasons for setting and working toward academic and behavioral goals were a motivating force. Students made the most progress in both of these areas when they identified and visualized the connections between what they were doing and why it was important to learn. Realizing that avoiding academic tasks had an immediate and long-term impact on academic goals was a real wake up call for some. It was when students began rolling their eyes and finishing the teacher-researcher's sentences using Thinking Maps® and Habits of Mind language or concepts that the teacher-researcher knew that she was adequately integrating the two concepts into the routines of the academic program. These were not extra or additional tasks for the teacher-researcher. Thinking Maps® and Habits of Mind were the how of the educational experience for both student and teacher-researcher.

The use of questioning strategies that guided students to discover concepts for themselves helped them own their learning. When students experienced personal discoveries and shared them as their own the entire class became motivated to learn. The careful scaffolding of questions was critical to this process. Beginning with an accurate understanding of what the student's perceptions was critical. Learning and thinking are developmental tasks.

Skipping steps can lead to confusion and frustration. The teacher must correctly diagnose the next piece of information or clarification needed in the learning process. Then formulate an experience or question to provide what is needed at the time. Progress monitoring, action research, Cognitive Coaching, and other constructivist practices support this ongoing and cyclical process.

The schedule provided for a total of three and one half hours per day of supervised activity. One hour each day was spent on breaks and transitions. This included: morning snack, lunch, recess, and transition to and from the classroom. Thirty-five minutes each day were spent in the Technology center working with the Math Whizz program. That left just under two hours each day for the teacher researcher to plan academic activities. Students were encouraged to continue practicing Habits of Mind during the hour of non-academic activities.

The practices of the workshop model, Thinking Maps and Constructivist questioning based on Cognitive coaching can easily be scaled up to fit the regular classroom on a full day schedule. The first step is to establish a block schedule allows for content integration. Establish a ten to fifteen minute whole class instruction time in each block. The rest of the time should be used for group work based on skill and independent work time. Set a schedule for conferences that allows each student a five minute literacy focused conference and a five minute math focused conference once a week. It is best if the two conferences are a few days apart. In a classroom of 30 students the teacher should meet with six students for literacy and another six for mathematics conferences. This should take about half an hour of literacy and half an hour of math. Leaving about an hour of reading and an hour of math time for a small group work and a ten to fifteen minute lesson.

Scaffolded instruction designed to identify the unique support needed by each student and foster academic growth was the intention of the researcher. The researcher used a constructivist philosophy that combined: Thinking Maps®, Habits of Mind, workshop, and questioning. The environment created by the researcher promoted academic growth in the students. Students found the use of Habits of Mind and Thinking Maps® to be effective. The researcher used conferences, skill groups, and personalized objectives to scaffold instruction for this group of struggling learners. The consistency with which instructional methods were used across content and settings helped students understand and apply the tools of Thinking Maps® and Habits of Mind.

Future Research

The teacher-researcher sees several extensions to this research project. Future research in this area could seek to answer the following questions.

What further impacts of supported metacognition can be found?

Is metacognition really the third dimension of the taxonomy of learning?

What connections can be identified between Piaget's developmental learning theory and the development of Habits of Mind?

What connections can be found between the work of Glasser or Maslow and the Habits of Mind?

Would the development of Habits of Mind continue if the research was extended for several months?

Would the research yield similar results if conducted during the regular school year with the teacher-researcher working part of the school day with the participants?

Would the research yield similar results if conducted during the regular school year with the teacher-researcher as full time teacher?

How much time spent in focused interaction using Thinking Maps® as a reflection tool is needed to develop a Habit of Mind?

How long does an individual need focused interaction using Thinking Maps® as a reflection tool for a Habit of Mind to truly become a habit?

In a longitudinal study, would the students continue to develop the Habits of Mind through the reflective use of Thinking Maps®?

What was the role of the workshop model of instruction vs. the use of Thinking Maps® in the development of Habits of Mind?

Would the results be different if a different research methodology were used?

Would similar results be derived if the instruction was delivered in another format (lecture, individualized, direct)?

Are these behavioral and academic performance gains maintained by the participants over time with no instructional support after the initial research?

How is the development of Habits of Mind impacted when more than one teacher a student encounters uses Thinking Maps® to intentionally develop the Habits of Mind?

How would a school wide behavior management program be developed to use Thinking Maps® and develop the Habits of Mind?

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Appendices

Appendix A

Fourth Grade Reading Standard

Component 2.4 Think critically and analyze author's use of language, style, purpose, and perspective in literary and informational text.**2.4.1 Apply the skills of drawing conclusions, providing a response, and expressing insights to informational/expository text and literary/narrative text. W**

- Give a personal response that demonstrates insight about text, using a teacher-generated prompt (e.g., what would be the best/worst part of an event or situation).
- Draw conclusions from text, citing text-based information to support the conclusion (e.g., how the story or information might be useful; to whom a story or information might be useful).

2.4.2 Analyze the author's purpose for and style of writing in both informational/expository text and literary/narrative text. W

- Determine the author's purpose and support decision with evidence/details from text.
- Identify and explain how the author's use of word choice, sentence structure and length, and/or literary/narrative devices affects the reader, using a variety of texts.

2.4.3 Understand the difference between fact and opinion. W

- Identify facts and opinions; provide evidence from the text to support your answer.
- Select, from multiple choices, a statement that is a fact or an opinion.

2.4.4 Evaluate author's effectiveness for a chosen audience. W

- Read an article and decide if a chosen audience (e.g., teachers, parents, classmates) would agree or disagree with what the author says.

2.4.5 Understand how to generalize from text. W

- Generalize about a topic after reading more than one text (e.g., make generalizations about life on the prairie after reading several informational/expository and literary/narrative accounts of the migration west).
- Generalize about characters and characteristics in similar stories from different cultures (e.g., the "trickster" type tales such as Coyote in Native American literature; animals in African folk tales like Ananzi (the spider); and Br'er Rabbit stories of the Deep South).

Appendix B

Introductory Thinking Maps® Lessons

SESSION 1

Objective: Defining in Context

Activities: Use a Circle Map to define self.

Add a Frame of Reference to identify influences.

Share Map with partner.

Share 1 new idea about your partner.

Outcome: Students will correctly and independently construct a Circle Map with a Frame of Reference that defines them.

SESSION 2

Objective: Describing Qualities

Activities: Create a group Circle Map of possible adjectives that can be used to describe people.

Create a Bubble Map to identify personal qualities.

Confirm that only adjectives and adjective phrases are used.

Add a Frame of Reference to identify influences.

Share Map with partner.

Share 1 new idea about your partner.

Outcome: Students will correctly and independently construct a Bubble Map using adjectives and adjective phrases and a Frame of Reference.

SESSION 3

Objective: Comparing and Contrasting

Activities: Create a Double Bubble Map to identify similarities and differences between self and a partner.

Add a Frame of Reference to identify influences.

Share Map with partner.

Share 1 new idea about your partner.

Outcome: Students will correctly and independently construct a Double Bubble Map with a Frame of Reference.

SESSION 4

Objective: Categorizing

Activities: Create a Tree Map to organize information about self by categories.

Add a Frame of Reference to identify influences.

Share Map with partner.

Share 1 new idea about your partner.

Outcome: Students will correctly and independently a Tree Map to organize information about self by categories with a Frame of Reference.

SESSION 5

Objective: Part to whole relationships

Activities: Create a Brace Map to organize information about a favorite outfit.

Add a Frame of Reference to identify influences.

Share Map with partner.

Share 1 new idea about your partner.

Outcome: Students will correctly and independently a Brace Map to organize information about a favorite outfit with a Frame of Reference.

SESSION 6

Objective: Summarizing and synthesizing

Activities: Use a combination of a Flow Map and Tree Map to write a 1-paragraph essay about yourself.

Outcome: A pre-write and rough draft of a 1-paragraph essay entitled "Who am I?"

SESSION 7

Objective: Sequencing

Activities: Create a class Circle Map of possible fun things to do and places to go.

Create a Flow Map to organize information about a Dream Day.

Add a Frame of Reference to identify influences.

Share Map with partner.

Share 1 new idea about your partner.

Outcome: Students will correctly and independently a Flow Map to organize information about a Dream Day with a Frame of Reference.

SESSION 8

Objective: Cause and Effect

Activities: Make a Circle Map of things we would like to help improve.

Create a Multi-Flow Map to organize information about a situation or thing you want to make better.

Add a Frame of Reference to identify influences.

Share Map with partner.

Share 1 new idea about your partner.

Outcome: Students will correctly and independently create a Multi-Flow Map to organize information about a situation or object you want to make better with a Frame of Reference.

SESSION 9

Objective: Analogous relationships

Activities: Create a Bridge Map to organize information about a favorite outfit.

Add a Frame of Reference to identify influences.

Share Map with partner.

Share 1 new idea about your partner.

Outcome: Students will correctly and independently a Brace Map to organize information about a favorite outfit with a Frame of Reference.

SESSION 10

Objective: Reflection and Precision

Activities: Revise one or two of the Thinking Maps® you created about yourself.

Whole group discussion about why specific changes to the Thinking Maps® content were made.

Use a combination of a Flow Map and Tree Map to write a 1 to 3-paragraph essay about yourself.

Outcome: Increased use of detail and specific vocabulary.

SESSION 11

Objective: Evaluation

Activities: Complete a 1 to 3-paragraph essay about yourself

Use a rubric to evaluate your own work.

Share your work with the group.

Outcome: A well constructed essay on a topic of interest that demonstrates at least one critical thinking process addressed in one of the Thinking Maps®.

Appendix C

Habits of Mind Poster

1. Persisting – Stick to it.
2. Managing impulsivity – Take your time. Think before you act. Remain calm, thoughtful, and deliberate.
3. Listen with understanding and empathy – Seek to understand others. Put your own ideas and emotions aside so you can better understand others.
4. Thinking Flexibly – Look at the situation another way. Change your perspective. Think about options.
5. Think about thinking (metacognition) – Be aware of what you are thinking and feeling, how you are acting, how your actions affect others, and why you make the choices you make.
6. Striving for accuracy – Check it again. Be detailed and correct.
7. Question and pose problems – Use data to understand. How do you know? What information do you need? How can you gain the information you need?
8. Apply past knowledge to new situations – Use what you learn in a new way.
9. Thinking and communicating with clarity and precision – Be clear, detailed, and accurate.
10. Gathering information through all senses – Use your nose, hands, feelings, ears, and eyes.
11. Creating, Imagining, Innovating – Try a different way. How many different ways can it be done?
12. Responding with wonderment and awe – Wow, Cool, Why, How

13. Taking Responsible risks – Stay within the “rules” and then take one-step beyond where you are comfortable. Do more than is expected.
14. Finding Humor – Look for the unexpected and silly.
15. Think interdependently – share the work and learning with others. Do your part in the group and share what you know.
16. Remaining open to continuous learning – Look for opportunities to learn and take them. Admit what you do and don’t know.

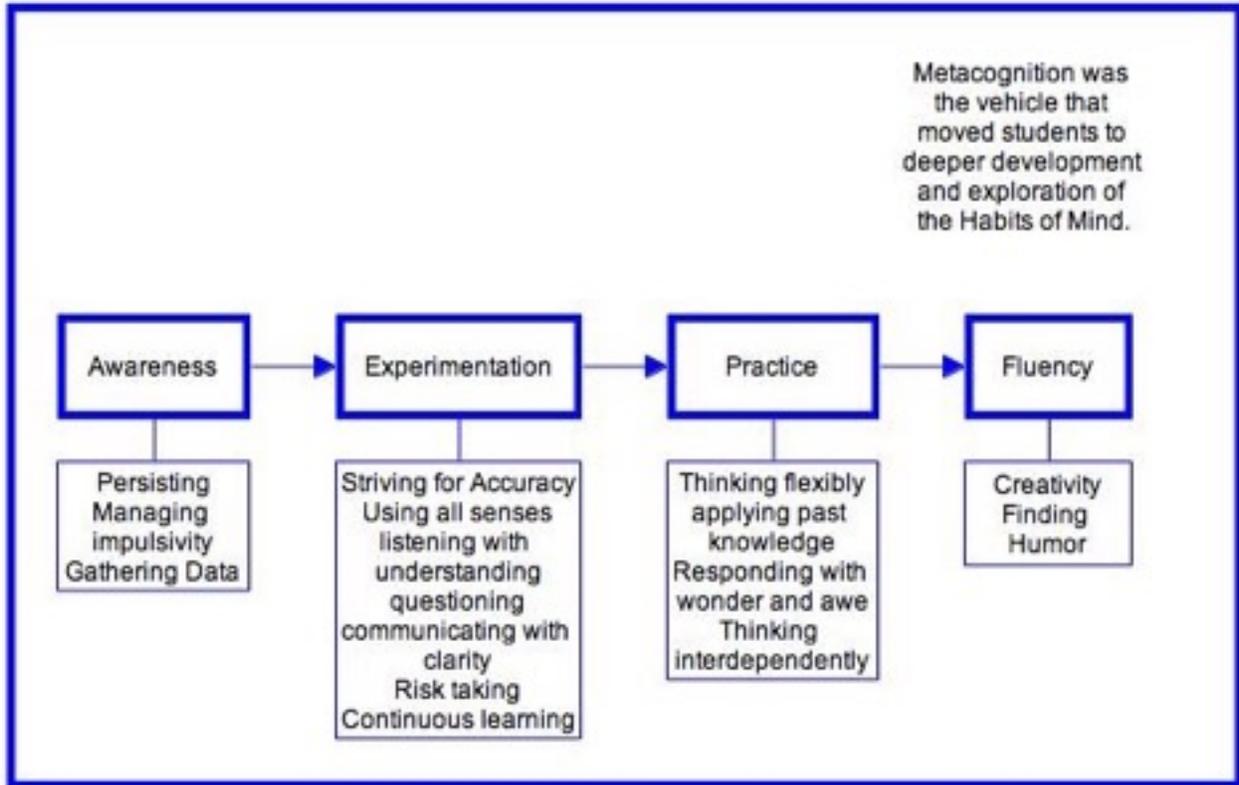
Appendix D***Habits of Mind Student Worksheet*****Habits of Mind: How Successful People Think**

Behavior	Definition	Symbol	Example
1. Persisting	Stick to it.		
2. Managing impulsivity	Take your time. Think before you act. Remain calm, thoughtful, and deliberate.		
3. Listen with understanding and empathy	Seek to understand others. Put your own ideas and emotions aside so you can better understand others.		
4. Thinking Flexibly	Look at the situation another way. Change your perspective. Think about options.		
5. Think about thinking (metacognition)	Be aware of what you are thinking and feeling, how you are acting, how your actions affect others, and why you make the choices you make.		
6. Striving for accuracy	Check it again. Be detailed and correct.		
7. Question and pose problems	Use data to understand. How do you know? What information do you need? How can you gain the information you need?		
8. Apply past knowledge to new situations	Use what you learn in a new way.		

9. Thinking and communicating with clarity and precision	Be clear, detailed, and accurate.		
10. Gathering information through all senses	Use your nose, hands, feelings, ears, and eyes.		
11. Creating, Imagining, Innovating	Try a different way. How many different ways can it be done?		
12. Responding with wonderment and awe	Wow, Cool, Why, How		
13. Taking Responsible risks	Stay within the “rules” and then take one-step beyond where you are comfortable. Do more than is expected.		
14. Finding Humor	Look for the unexpected and silly.		
15. Think interdependently	Share the work and learning with others. Do your part in the group and share what you know.		
16. Remaining open to continuous learning	Look for opportunities to learn and take them. Admit what you do and don't know.		

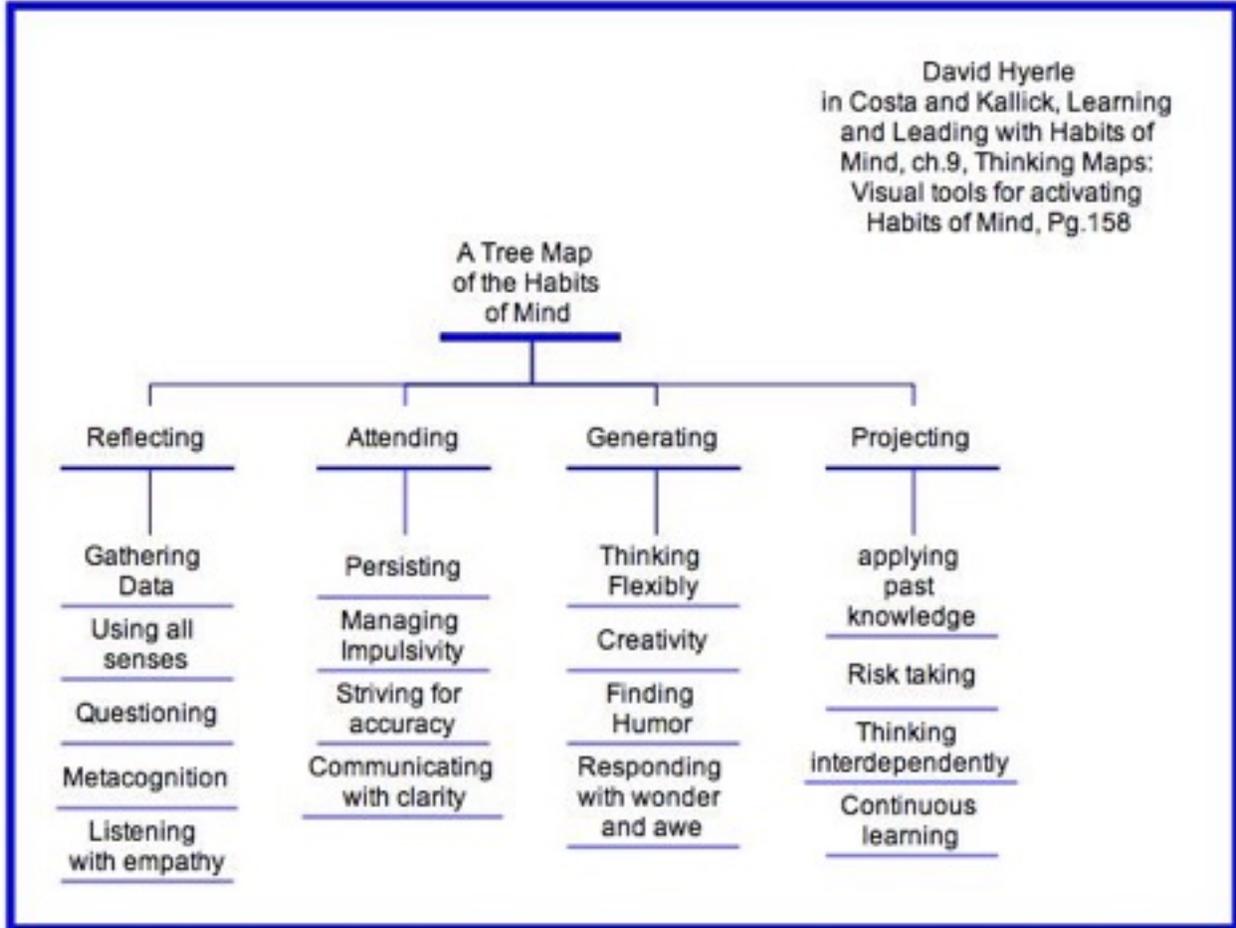
Appendix E

Habits of Mind Patterns of Development



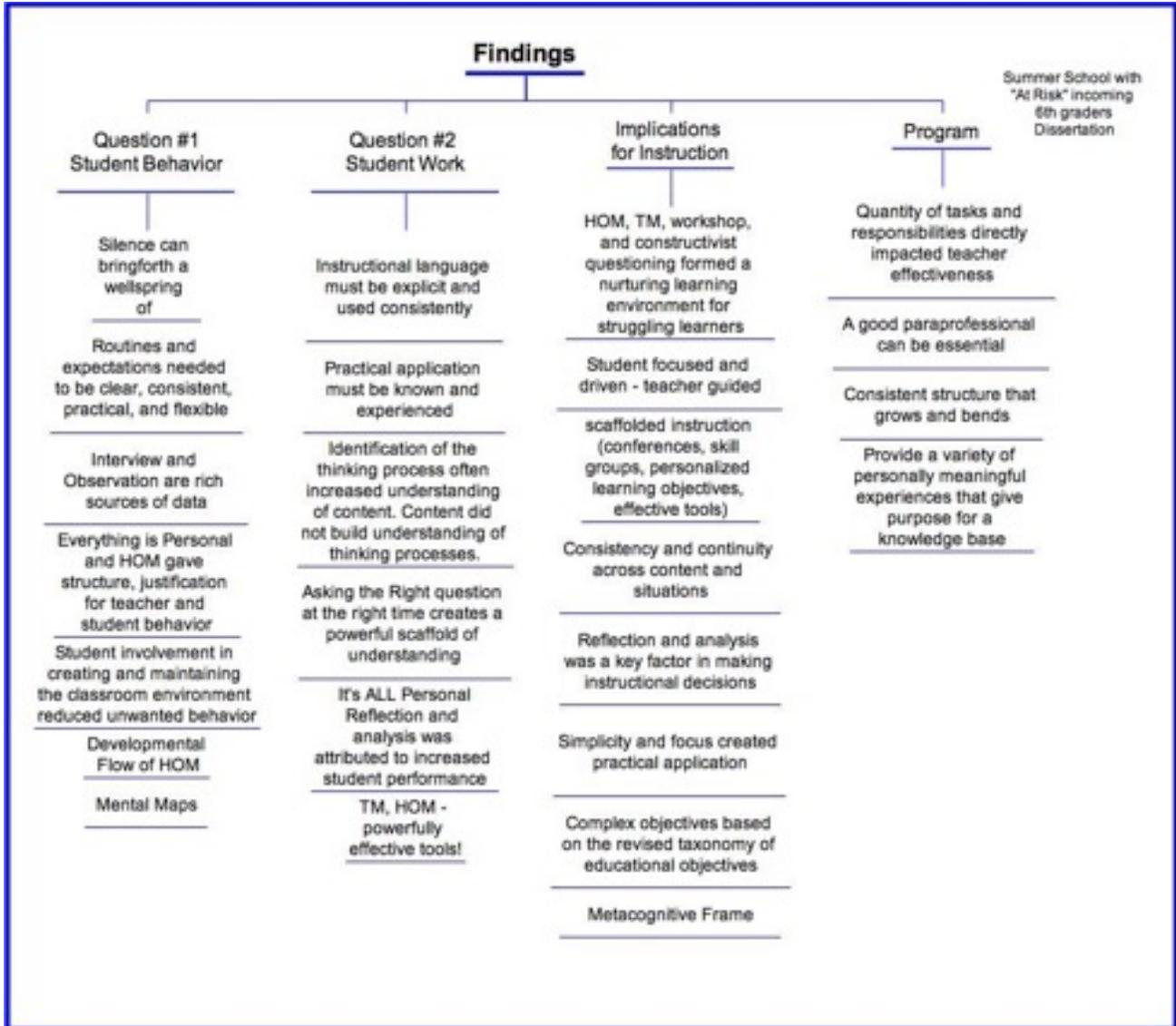
Appendix F

Habits of Mind Categorized



Appendix G

Findings



*Appendix H***Glossary of Key Terms****A**

Anecdotal Data – Notes written in narrative form by the teacher-researcher.

B

Brain – The organ in the human body that controls most bodily functions, processes information, and uses chemical and physical means to create and transmit thought.

C

Century 21 – A grant program created and funded through NCLB legislation and managed by individual states. Priority is given to established educational institutions that work with low income and ethnically diverse populations not meeting the state defined academic standards.

Constructivist – A pedagogy that is centered on the belief that true knowledge is developed in the mind of the learner. It is the learner that must create understanding and a teacher creates an environment that is rich in opportunities to develop understanding. A person that uses questioning, interactive tasks, and open-ended tasks in which students are likely to discover and apply specific learning objectives is using constructivist techniques.

Content Specific Vocabulary – Language that has precise meaning in a specific subject area is considered content specific vocabulary.

Content Standards – The specific documents approved by each state that define the concepts and skills students are to learn and is organized by content areas such as reading and math.

Craftsmanship – The intentional application of skills and experience to create a final product of high quality.

Critical Thinking – Analytical thought often referred to as logical reason, intentional action, or unique perspectives are identified as outcomes of critical thinking. It is often prized for its

unique perspective or the way in which it improves a situation.

D

Differentiated Instruction – classroom instruction that is intentionally designed to meet the individual needs of students.

E

ELL – English Language Learner

F

G

H

Habits of Mind – Sixteen patterns of thinking found in successful individuals: persisting, managing impulsivity, listening with understanding and empathy, thinking flexibly, Metacognition, striving for accuracy, questioning and posing problems, applying past knowledge to new situations, thinking and communicating with clarity and precision, gathering data through all senses, creating/ imagining/ innovating, responding with wonderment and awe, taking responsible risks, finding humor, thinking interdependently, and remaining open to continuous learning.

I

IEP – A legal document that specifies specific learning objectives and is signed by a special education teacher, parents, a district representative and other school employees involved in the education of a specific student. It is called an Individualized Education Plan.

J

K

L

M

Majority Minority – A population in which the majority of individuals are members of ethnic minorities.

N

NCLB – No Child Left Behind, A federal law governing the education of children in the United States. It is a revision of PL 94-142.

O

OSPI – Office of Superintendent of Public Instruction, The office of the elected official in the state of Washington who oversees public education.

P

Paraeducator – A person trained to work alongside an educator.

Portfolio – A collection of original work and resources used to show an individual's skills and other abilities.

Q

R

Reflection – review and analysis of a task, concept, or situation.

S

Specificity – detail in communication

State Standards – A set of specific academic learning requirements defined by individual states in several subject areas such as reading, math and writing.

T

U

V

W

WASL – Washington Assessment of Student Learning, the Washington state standardized assessment used to measure student progress and reported publically as well as to the federal government in accordance to NCLB legislation. This assessment was last administered in the spring of 2009. A new assessment will replace the WASL in the spring of 2010.

X

Y

Z