UNDERSTANDING HOW ELEMENTARY TEACHERS
USE AND CONCEPTUALIZE VISUAL DIGITAL LESSONS
AS A TEACHING STRATEGY

by

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A Dissertation
Submitted to the
Graduate Faculty
of
George Mason University
in Partial Fulfilment of
The Requirements for the Degree
of
Doctor of Philosophy
Education

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Date: 11-1-2010

Fall Semester 2010
George Mason University
Fairfax, VA
Understanding How Elementary Teachers Use and Conceptualize Visual Digital Lessons as a Teaching Strategy

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy at George Mason University.

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DEDICATION

This is dedicated to my loving husband Bill Reighard,
my wonderful parents
Paul and Betty Jane Negley,
and my brother and sister, Shannon Negley and Rosanna Burkholder.
ACKNOWLEDGEMENTS

I would like to thank my family, friends, and work associates for supporting and encouraging me through this process. Without all of you, this degree would have been impossible to achieve. My loving husband, Bill Reighard, proof read many class papers and took up the extra slack around the house allowing me time to research and write. Kathy Downey twice proofed my dissertation. Terri Hanson, Jodi Moore, and Dianna Mellott read dissertation chapters and provided valuable input on my writing. Jan Streich and Barb Dickinson allowed me flexibility in my work schedule throughout this journey. My research participants opened their classrooms so that I could learn from them. Dr. Warrick, was there at the beginning of this journey, and always encouraged me to “go for it”. Dr. Maxwell, my chairperson and research teacher, whose wonderful advice, gentle encouragement, and wisdom allowed me to finish this journey in five years.
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LIST OF ABBREVIATIONS

VDL - Visual Digital Lesson

VAK – Visual, Auditory, and Kinesthetic

ITRT – Instructional Technology Resource Teacher

ANGEL – ANGEL Learning, Inc. is a leading provider of enterprise e-learning software and services
ABSTRACT

UNDERSTANDING HOW ELEMENTARY TEACHERS USE AND CONCEPTUALIZE VISUAL DIGITAL LESSONS AS A TEACHING STRATEGY

Katrina Negley, Ph.D.

George Mason University, 2010

Dissertation Director: Joseph Maxwell, Ph.D.

How can teachers create a greater opportunity for student understanding in today’s classroom that has more and more access to technology? One way may be to utilize the use of pictures and graphics through combining visual digital media into lessons.

As an instructional technology resource teacher with a background as an art teacher, I have seen how visual digital lessons (VDLs) bring relevance and greater understanding to student learning. The work of many prominent researchers has backed this up, yet many teachers do not use visual digital lessons. The purpose of this study was to gain a better understanding of why and how high-VDL-using elementary teachers used this strategy as a tool to facilitate student learning. I also wanted to discover if teachers’ education, experiences, and beliefs influenced their use of VDLs.
A qualitative study of eight elementary teachers using observations, personal interviews, and teacher reflections found teachers use two types of visual digital lessons. I labeled these emergent lessons *Process Focused* and *Product Focused*. Process Focused lessons allow students to process content knowledge visually through interpreting and/or elaborating. Product Focused lessons allow students to research, plan, and organize their thinking by creating a product with a cohesive visual message.

Results show that these high-VDL-using teachers share common learning views, beliefs, and goals for the lessons. Using the knowledge from this study, I plan to create professional development courses for teachers to encourage the use of visual digital lessons and model how to implement the lessons into their classrooms.
Chapter 1: Introduction

I am my county’s “expert” visual literacy speaker. In this capacity, I speak at professional development programs about the value and purpose of visual literacy in the classroom. My topics include how visual literacy plays an important role in the way the teachers deliver instructional content to their students. I share design tips and point out how culture influences visual messages. I lead teachers in an activity where we work on redesigning instructional materials to remove potential visual and cultural barriers for students. Finally, I encourage teachers to allow students to provide evidence of learning through forms other than just text. We discuss and design rubrics as an excellent way to evaluate this type of learning.

I became the county’s visual literacy speaker because of my 12-year background as a former art educator with experience at the K-12 grade levels. For the last five years, I have worked as an instructional technology resource teacher (ITRT). My educational role switch happened in 2004 when the Virginia State General Assembly authorized and funded this new educational position. In 2005, I accepted a position to become one of Shannon County’s (pseudonym) original ITRT members.

My job was at two elementary schools where, as an embedded professional developer, I worked with teachers to enhance their teaching practices by integrating technologies into their teaching. At this time, I noticed that when teachers taught with
digital technologies, there were many opportunities to use visuals to enhance the
student’s learning into the current digital lesson. For example, fourth grade students could
design Virginia region billboard ads. A fourth grade Virginia Studies’ Standard of
Learning requirement specifies that students need to know the five Virginia regions,
Virginia's Coastal Plain (Tidewater), Piedmont, Blue Ridge Mountains, Valley and
Ridge, and Appalachian Plateau, the characteristics of each region, the major industries
of each region, and the products that each region produces. A student, or a group of
students, could design a billboard to promote Virginia’s five land regions, the land
characteristics, its industries, and products. These types of projects allow students to
synthesize and organize content information into one cohesive unit. Allowing students to
construct their evidence of knowledge in a novel yet complex way helps promote transfer
of knowledge instead of just rote memorization (Anderson et al., 2001; Bransford,
Brown, & Cocking, 1999).

My former art teacher experience and education background led me to see visual
learning opportunities in the content information. However, I observed that most teachers
either did not take advantage of visual learning opportunities or underused them.

I believe that there are two types of visual learning lessons. Teachers can use
lessons that focus on helping students process information visually or use lessons that
produce a new synthesized product. The latter type of lesson can be used to teach
students visual literacy skills.

Visual literacy skills are becoming more essential as our world has become more
dependent on the graphic-rich World Wide Web for information and services (Ohler,
Culturally, our world has changed from one where students graduated from school and competed locally for jobs to one where there is now global competition (Friedman, 2005). This new world requires a much different set of the skills than it did 30 years ago. As our culture has changed, so has the call for American classrooms to change (Friedman, 2005; Pink, 2005; Tapscott, 2009). Most students’ ability to access visual-rich digital media in their phones and personal computers calls for teachers to adapt these technologies into their classrooms (Warlick, 2004). Web 2.0 technology tools allow everyone to be a published artist by simply uploading to the World Wide Web. Students need to understand how to communicate effectively and responsibly with visuals and text (Partnership for 21st Century Skills, 2008; Jenkins, 2006).

While graphic software and the Internet make it easy to create and share visual messages, creating an effective visual message is much harder. This requires the artist to understand elements of design and how these work together to make a message accessible and visually desirable to the viewer. The artist needs to design with purpose and clarity of message in mind. She needs to know and understand the cultural context of the eventual viewer. This is a not an intuitive skill but one that is learned (Burmark, 2002; Riesland, 2005). This is visual literacy.

Visual literacy is a broad term with many different interpretations. For the purpose of my study, I am defining visual literacy as the ability to interpret and create visual messages (Messaris, 1998; Horn, 1998). Educating students to understand and
communicate by combining graphics and text helps prepare them for the digital global economy (Riesland, 2005).

This new way of using and creating media to communicate is changing the culture of our students. Jenkins (2006) calls this new culture the Participatory Culture. He defines the Participatory Culture as the following:

A culture with relatively low barriers to artistic expression and civic engagement, strong support for creating and sharing one’s creations, and some type of informal mentorship whereby what is known by the most experienced is passed along to novices. A participatory culture is also one in which members believe their contributions matter, and feel some degree of social connection with one another. (p. 3)

It is the relationship of user-friendly graphic software and instant mass-share technologies that is creating a need for widespread visual literacy.

A growing body of literacy research looks at the importance of achieving these intersecting skills as necessary to being successful in our increasingly technical society. Burmark (2002) considers visual literacy the primary literacy of the 21st century. However, at this time no federally mandated basic art education policy exists in American schools (Jensen, 2001). While some schools systems are adding visual literacy to the education curricula, the Virginia Department of Education has not (VDOE, 2006).

The majority of elementary school students receive art education once a week. A designated art educator who relies heavily upon standard media such as clay, paint, or crayons rather than digital media usually provides this service. The Virginia Art
Standards of Learning has just one third grade and one fifth grade standard that call for the use of any type of technology in the elementary curriculum. Of these, only the fifth grade standard, VART 5.13, calls for using technology to produce a work of art (VDOE, 2006). While Virginia's students may be learning about design in the art room, they are not receiving comprehensive education in how to interpret and create visual digital messages. Furthermore, based on my experience, I do not believe the art education professional should “own” the visual digital curriculum.

Another possible avenue in teaching visual literacy is during a “computer-time.” For many elementary school children, this time consists of a fixed weekly time. This time is spent working on a multitude of educational digital activities, such as, creating projects, drill and skill games, and webquests. Starting four years ago with the hiring of the ITRTs, most Shannon County Public Schools eliminated fixed weekly schedule computer times. The reason behind this was the belief that if teachers could schedule their own technology time, seamless integration was more likely. Teachers can sign up for multiple sessions during a week depending on the time required for the lesson. They can also choose the computer lab or laptop carts. The advantage of the classroom teachers’ flexible schedule compared to the art teacher’s inflexible schedule means that the former is more likely to teach using more visual literacy opportunities simply because of available time to use technology.

My study looks at the interconnected areas of visual literacy and digital media as a learning tool in the elementary classroom. Lessons that use the strategies of visuals in digital media lessons I call visual digital lessons (VDLs). I believe the visual component
in the digital lessons can have a beneficial impact on student learning (Marzano, 2007; Jensen, 2001).

**Topic and Purpose of my Study**

My study originated from my art education and ITRT experiences. I relied on the framework of practitioner research and drew on my experiences to develop the inquiry (Dadds, 1998; Kershner, 1999). Practitioner educational research, recognized since 1947, is research that is carried out by teachers in their classrooms for the purpose of improving their own practice (Groundwater-Smith & Mockler, 2005).

My research looked into why and how teachers integrate VDLs into their classroom instruction. This research can contribute to developing a professional development course for teachers to encourage the use of integrating VDLs across content areas. VDLs can provide instructional strategies to benefit students learning. The qualitative study looks at what high-using VDL elementary teachers actually do when providing these opportunities.

The study took place in Shannon County. This county, since the 2005-2006 school year, has emphasized professional development sessions with the focus of changing teacher practices to include 21st century technologies. The study looked at how teachers felt about this pressure to change traditional practices to those that include 21st century skills. The study also looked for influences that showed a link to teachers’ experiences, background, interests, talents, and beliefs and how these influenced how she taught VDLs.
Chapter 2: Conceptual Framework

The purpose of the study was to investigate how and why these eight high-using VDL elementary teachers in Shannon County used this strategy. When creating my conceptual framework, there were several areas I considered. I looked at how visuals fit into cognitive learning theories and considered the significance of visual literacy in visual learning products. I examined the influences that affected the teachers’ use of VDLs. Finally, I considered the pressure on teachers to change their classrooms to accommodate the influences of 21st century skills and visual digital instructional strategies.

Instructional Theories, Research, and Educational Philosophy

Few would argue that a picture helps us understand information better than just verbal instructions. There are three cognitive learning theories that help me understand how the visual system fits into a students’ learning. These theories are dual coding theory, schema theory, and cognitive load theory (IARE, 2003).

Cognitive learning theories.

Dual coding theory (Paivio, 1986) asserts that we process information both verbally and visually. These two processes are independent but interconnected. “The nonverbal subsystem is specialized for processing information about nonverbal objects and events, whereas the verbal system is specialized for processing language” (p. 398).
The relationship between the verbal and nonverbal part of thinking is what stores the information in our long-term memory. The more we use both verbal and nonverbal modes of thinking the better we are able to retain information (Marzano, Pickering, & Pollock, 2001; Paivio, 1986).

Schema theory explains that within our memory exists schemas, or networks of information (Doyle, 1999). The event of learning links new information to existing information. The schema provides “a framework on which new knowledge can be attached and, consequently, comprehension will improve” (IARE, 2003, p. 16). Many graphic organizers are designed to help students link their existing knowledge to new classroom knowledge.

Cognitive load theory (Sweller & Chandler, 1991) suggests that our working memory has a maximum amount of information it can process at one time. If the amount of information we receive exceeds the load we can handle, learning cannot take place. To avoid cognitive overload, information can be grouped or chunked into smaller elements thereby allowing the brain to remember and recall (Yu, 2002). A familiar example of chunking is our ability to remember our ten-digit phone number. We chunk our phone number into three groups of three or four digits, which allows the brain to access the information easier. Graphic representation and organizers can help students by providing a visual frame to place verbal or textual information. Once this information is organized and physically represented, the working memory is free to process more information (IARE, 2003).
I provided this brief overview of theories to explain how students learn, and how teachers can use visual strategies to enhance students’ understanding. However, there are two other concepts that influence the Shannon County teachers’ practices. They are learning styles and the educational philosophy of Constructivism.

**Learning styles and individualized instruction.**

Shannon County has a long history of encouraging teachers to adapt lessons to the visual, auditory, and kinesthetic (VAK) learning styles of students. Many county workshops have VAK theory embedded as part of the content. Teachers are encouraged to design lessons that motivate learners of different styles. Principals, while viewing lesson plans, often look to see how teachers are accommodating these various modalities. However, where had this idea originated? I thought it would be easy to search out the roots of this theory. After all, I first learned about learning styles thirty years ago in my undergraduate days. Unfortunately, after several days of searching literature for VAK learning style models, I discovered it was not one tidy and empirical research based theory.

My first attempt to discover the reasons for inclusion of VAK learning styles in our teaching practice was to check the county’s recommended educational books. Although I often found writers recommending structuring lessons to accommodate the VAK learners, there were no specific references given to the actual scientific research of the theory. A search on Google for visual, auditory, and kinesthetic learning styles produced 29,700 hits. Many of these sites offered definitions and free self-inventories. However, the sites did not include research as to how this theory started or for that matter
any evidence that this theory works. As my search became more in-depth, I found a plethora of information on learning styles. I discovered little empirical data that the practice of teaching for students’ preferred VAK styles improves students’ outcomes (Sharpa, Bowkerb & Byrnec, 2008).

I was intrigued at how learning styles became part of the educational picture. Therefore, I began to look at the history and development of learning styles in education. Honigsfeld and Schiering (2004) write that the first documented idea about learning styles may be Confucius’ saying: “I hear and I forget, I see and I remember, I do and I understand” (p. 488). However, the current understanding of learning styles seems to have materialized from cognitive learning research in the mid-20th century (Cassidy, 2004; Hall & Moseley, 2002; Honigsfeld & Schiering, 2004). In Hall and Moseley’s (2005) overview of learning styles, they classified 50 models into five groups. They then placed each group on a continuum that looked at how a specific theory viewed the roles of genetics, inherited traits, and cognition. The VAK style was included in the groups that had the strongest beliefs about the fixed inherited traits of a learning style (p. 246). The work of Dunn and Dunn (1978) falls into this group and has direct ties to the classroom. This model has 21 elements and five stimulus strands. The physiological strand addresses visual, auditory, and kinesthetic preferences of the individual. Along with perceptual strengths, this strand also includes time-of-day energy levels, and patterns and routines (Dunn & Dunn, 1978; Dunn, Beaudry, & Klavas, 1989).

was appropriate to discover preferences in learning styles; however, they wanted to document learning strengths. Their 1979 study of 1,000 California schoolchildren attempted to assess VAK modality strengths. The study asked students to recreate patterns of geometric shapes of increasing lines. The students used auditory, visual, and kinesthetic means to present the patterns. Their study, written up in Education Leadership in 1981, supported the idea that “student modality strengths should be considered in instructional planning, including selecting or developing media and materials, designing and the physical plan (p. 379).

One of the problems with the learning style theory is the reliability of the self-ascribed inventories survey tool (Geake, 2008; Sharpa, et al., 2008; Sparks, 2006; Stahl, 1999). There is also concern about the little empirical evidence matching students to their preferred learning style results and increased academic achievement (Sharpa, et al., 2008; Curry, 1991; Sparks, 2006).

Regardless of the scientific debates around the validity of VDK theory, I believe this theory has been a rallying call for teachers to provide a richer content menu for their students (Sousa, 2003). Based on my classroom experiences as a student four decades ago, most of Shannon County Public Schools’ K-5 classrooms are more exciting and engaging today. No longer are our classrooms a one-size-fits-all approach. However, since we all experience our world in multiple sensory modalities, there is no need to label a child as a certain type of learner. The teacher should not pigeonhole students into one type or style of learning, but strive to enrich and individualize the educational experience.
through multiple methods of instruction. Instead, teachers should be encouraged to find and use different approaches to benefit all students.

**Educational philosophy of constructivism.**

Constructive theorists (Brooks & Brooks, 1999; Yu, 2002) also challenge the traditional classroom. Constructivists state that learners do not receive information as it is presented. Instead, learners need to restructure that information from their own experiences. Only through interpretation does understanding and learning happen. The assumption is that teachers should present information in a way that students can actively restructure the content. Anderson et al., (2001) describe the constructivist learning as students who are actively engaged in “cognitive processing, such as paying attention to relevant incoming information, mentally organizing incoming information into a coherent representation, and mentally integrating incoming information with existing knowledge (p. 65).”

Learning is often a social event where students are free to exchange ideas with their peers and their teachers. Teachers are encouraged to design pair and group activities to allow students to interact and interpret information. A constructivist classroom relies on primary sources, manipulative materials, and social learning (Frey, Fisher, & Everlove, 2009).

In summary, learning should be active, stimulating, and individualized for students needs. The role of visuals in education can be understood by looking at dual coding theory where information is processed simultaneously between verbal and visual. Schema theory states that teachers should design activities that help students link new
information to prior knowledge. These connections can be depicted through visual representations. Cognitive load theory suggests that teachers need to help students chunk information by grouping elements for easier memory retrieval. Graphic organizers can help students chunk information into visualizations to provide better recall.

**Research for Visuals as Process Focused Lessons**

Bruner (1990), in his book *Acts of Meaning*, built upon Vygotsky’s theoretical framework that social interaction plays a fundamental role in the development of cognition (1978). Bruner describes the process we use to make sense of our world and overcome our biological limitation as a tool kit.

The toolkit of any culture can be described as a set of prosthetic devices by which human beings can exceed or even redefine the ‘natural limits’ of human functioning. Human tools are precisely of this order – soft ones and hard ones alike. There is, for example, a constraining biological limit on immediate memory – George Miller’s famous ‘seven plus or minus two’. But we have constructed symbolic devices for exceeding this limit: coding systems like octal digits, mnemonic devices, language tricks. (p. 21)

Visuals are part of the educational toolkits. They can be used for instruction and to aid students in recall and memory retention. Numerous studies (Mayer, Bove, Bryman, Mars, & Tapangco, 1996; Mayer & Gallini, 1990; Nuthall & Alton-Lee, 1995; Nuthall, 1999) all have evaluated the impact of visuals during instruction. They evaluated students’ memories after various forms of verbal and visual instruction. The studies
showed the simultaneous use of text and pictures improves student retention of knowledge.

The research by Mayer et al. (1996) showed how recall was positively affected when teachers provided students with multi-modes of instructional materials. “Students learn more effectively when words and illustrations are presented together rather than separately” (p. 72). Interestingly, this study showed that when teachers added more words to just verbal instructions, the students’ ability to explain core concepts actually decreased (p.71).

Mayer and Gallini’s (1990) study of 96 college students tested recall and problem-solving abilities after they had read and illustrated the working of how a brake system worked and functioned. Their findings showed evidence that supported the “potential of visually based instruction as a medium for promoting students' understanding of scientific material” when the following conditions are met: “text is potentially understandable, when the value of illustrations is measured in terms of learner understanding, when the illustrations explain, and when the student lacks previous experience” (p. 725).

Nuthall (1999) and Nuthall and Alton-Lee (1995) studied the content recall of elementary and middle school students who were taught the same material through three different types of instruction. The teachers used visual, dramatic, or verbal instruction. Students remembered 77% of the visual instruction, 57% of dramatic instruction, and 53% of verbal instruction. However, Nuthall (1999) cautioned that teachers needed to use
both visual and verbal content knowledge for students to link the new information to their existing knowledge schema.

Marzano (2007) suggests five strategies that are subcomponents of a teacher’s overall plan to help students actively process information. They are as follows: summarizing and note taking, nonlinguistic representations, questioning, reflection, and cooperative learning. Although Marzano encourages teachers to use all five strategies, and I also believe that all of these strategies are important, this study looks at nonlinguistic representation. Marzano defined nonlinguistic representations as any form of representation that does not use language. These representations included creating mental images, graphic organizers, mnemonic devices, drawing pictures and pictographs, and mental pictures (pp. 35-38).

**Mental images.**

Several studies (Gerlič & Jaušovec, 1999; Marzano, 2007; Nuthall, 1999) showed an increase in students’ ability to remember information if they construct their own mental images. Glenberg and Langston (1992) liken the creation of these mental images to using a *visuo-spatial scratchpad*. This mental scratchpad used one’s working memory to represent ideas. They believe a teacher’s use of pictures during instruction helps students create mental models, and this improves comprehension (Gerlič & Jaušovec, 1992; Marzano, 2007; Willoughby, Desmarais, Wood, Sims, & Kalra, 1997). However, they caution that this is not an automatic procedure and requires active listening on the part of the student. Cognitive load theory would also caution that one mental visuo-
spatial scratchpad has limits! Students need to physically represent these images to process large amounts of information.

**Graphic organizers.**

Graphic organizers are visual representations of knowledge, concepts, or ideas. There are many styles of graphic organizers. Horton, Lovitt, and Bergerud (1990) define graphic organizers as a “visuospatial arrangement of information containing words or statements that are connected graphically to form a meaningful diagram” (p. 12). Graphic organizers help students select, organize, and see connections between ideas, cause and effect relationships, visualize sequences, and hierarchal order (Armbruster, Anderson, & Meyer, 1991; Darch & Carnine, 1986; Horton et al., 1990; Robinson & Keiwra, 1996).

An Institute for the Advancement of Research in Education (2003) meta-analysis of 29 experimental and quasi-experimental studies that span grade levels and subjects showed graphic organizers had positive effects on students’ recall and understanding. Armbruster et al., (1991) studied fourth and fifth grade students who used a type of graphic organizer to identify main ideas from a social studies text. Armbruster et al., called this technique framing. A frame is a visual representation that helps students find and organize main ideas in informational text (p. 397). The study showed evidence that this type of graphic organizer was an effective tool that helped most students learn from text.

Darch and Carnine’s (1986) study of sixth grade special education students found that visual spatial displays that were combined with social and group tasks increased students’ comprehension. Horton et al.’s (1990) study of middle and high school students
using graphic organizers to learn from text in their social studies and science classrooms showed an increase in recall. Robinson and Keiwa’s (1996) study of college students showed marked improvement in students that used graphic organizers. In summary, I have highlighted just a few of the many studies that show an improvement when students use graphic organizers in learning. I chose these studies to show the impact of visuals on elementary to college level students has been researched.

**Mnemonic devices and memory aids.**

Vygotsky (1978) stated that “Normal children (ten to twelve years of age) recalled twice as many words when the pictures were available as memory aids as they did without them” (p 49). Mnemonic devices are systematic techniques designed to improve memory (Mastropieri, Scruggs, McLoone and Levin, 1985). Mnemonic devices can be symbols or substitutes of information. A symbol would be something that reminds the student of the content while a substitute would be an easy way to depict word that sounds like information it represents (Marzano, 2007, p. 54).

Marzano (2007) explained that when used properly, mnemonic devices involve students in higher-level thought processes. He stated that teachers should use mnemonic devices after students have processed information and have some understanding of the content. This elevates this device from the category of rote memorization to aiding students not only in recall but also in concept understanding (p. 38). The studies of Scruggs, Mastropieri, Levin, and Gaffney (1985) and Mastropieri, et al. (1985) support this idea. Both studies evaluated the recall of secondary students with learning disabilities.
and showed improved recall of information when the teacher employed mnemonic
instruction and thematic illustration.

**Drawing pictures, graphic representations, and pictographs.**

Teachers can design drawing and graphics activities that allow students to show
comprehension, summarize, or synthesize content ideas. A well-constructed graphic can
show in a glance the whole concept easier than many words can. Studies showed that the
activity of students drawing their own pictures, graphic representations, or pictographs
(symbolic pictures) to represent knowledge had a positive effect on student learning.
(Marzano et al., 2001).

Berkowitz’s (1986) study looked at sixth-grade students’ ability to recall passages
from their social studies textbook. Students were divided into two groups. One group
constructed their own graphics for main ideas. The second group studied a pre-made
graphic representation in the textbook. Students who constructed their own graphics
scored significantly higher on the test. The study showed two things of interest. First,
students who constructed their own graphics showed greater recall. Secondly, students
needed to be taught how to construct an effective graphic organizer. Hall, Bailey, and
Tillman (1997) study of college freshman had similar results. It found that when students
created an accurate representation from text, their understanding was as good as or better
than when an illustration was provided along with the text in the book (p. 679).

Drawing pictures, manually or digitally, is the tool I see used most within
elementary classrooms. Teachers from the beginning of kindergarten until the end of fifth
grade ask students to draw pictures based on content knowledge. Often these pictures are
evaluated for evidence of understanding. For example, students in fourth grade are asked to represent the phases of the moon, (new moon, waxing crescent, first quarter, waxing gibbous, full moon, waning gibbous, last quarter, and waning crescent). Used this way, it becomes a quick student assessment.

**Thinking visually.**

Visual thinking means taking advantage of our innate ability to see—both with our eyes and with our mind’s eye—in order to discover ideas that are otherwise invisible, develop those ideas quickly and intuitively, and to share those ideas with other people in a way that they simply get. (Roam, 1999, p. 4)

Roam, in his book *The Back of the Napkin*, encourages us all to make our thinking visible. He claimed that drawing makes our thinking visible and takes advantage of our innate ability to see our world. Roam defines seeing as selecting what the important information is, whereas looking is “the raw information that is in front of us” (p. 73). By seeing what we think, we can problem solve better and share our solutions with others (Roam, 2008).

Ritchhart and Perkins (2008) developed Project Zero’s Visible Thinking classroom approach for deeper student cognition. They developed a set of 30 thinking routines that students can be taught as classroom learning tools. This approach is based on the constructive theory that learning is an active and social endeavor. Ritchhart and Perkins say, “Thinking happens mostly in our heads, invisible to others and even to ourselves. Effective thinkers make their thinking visible, meaning they externalize their thoughts through speaking, writing, drawing, or some other methods” (p. 58). They report
that data from elementary and high schools that used this approach have shown improved
student learning (Ritchart & Perkins, 2008).

In summary, these visual strategies are tools in a teacher’s toolkit to help students
understand and retain knowledge. Visuals work because students interact with content
information by using visuals to elaborate and extend their knowledge. Graphic
representations and organizers help students organize and show the relationships, or
chunk it, for easier recall. Visual thinking works to help students see their thinking and
problem solve. All of the above activities focus on students using visuals for the process
of learning. These tools are valued for their active learning potential.

Research for Visuals as Product Focused Lessons

Marzano et al., (2007) defined the goal for the above strategies as producing a
nonlinguistic representation in the “mind of the students to enhance understanding of
content” (p. 73). If a physical representation, the product, resulted from that process, it
was immaterial. The previous research does not discuss the ways to improve the product.
Why would they? The purpose for these activities is to make students’ thinking visible
thereby helping the brain remember and understand.

There is a second way to use VDLs. This way extends the learning through the
process of creation into the final product. Unlike the process-focused activities, such as
graphic organizers, the goal for these lessons is to create a unified one message product
that can communicate a concept. Anderson et al.’s (2001) revision of Bloom’s Taxonomy
would classify this type of cognitive activity as Create.
Bloom’s Taxonomy.

The Revised Bloom’s Taxonomy revised the taxonomy’s cognitive process categories. These categories are now Remember, Understand, Apply, Analyze, Evaluate, and Create (Anderson et al., 2001). “Create category involves putting elements together to form a coherent or function whole” (p. 84). Create products are often valued for their unique quality; however, they must fit within the constraints of the project requirements. The lesson goal is for student to take ideas and information and synthesize them into a useful product.

The previously discussed visual learning process strategies fall in the Revised Bloom’s Taxonomy categories of Understand, Apply, and Analyze. The cognitive process involved is detecting and organizing a relationship between presented content information. Create involves construction of a new product. Students need to be involved in three steps in a Create lesson. These steps are problem representation, solution planning, and solution execution (Anderson et al., 2001).

Anderson et al., (2001) explain that the problem representation step is divergent. Teachers should give students a set of criteria that guides the product. This criteria set will also be used to evaluate the final quality of the product. This differs from the cognitive processes that students use in the Understand category. Here students use cognitive processes that typically bring them to one understanding of a concept (p. 86).

The solution-planning step involves the students deciding how they can develop a product that meets the requirement of the criteria. Usually this step involves an outline, or in the cases of visuals, sketches of the final product. Since many of these products are
group projects, this process requires breaking up the product into subtasks and assigning them to group members (Anderson et al., 2001, p. 87).

The solution-execution step involves carrying out the plan and producing a product. While the above steps involve cognitive processes, this step also requires a different set of skills. In this step, the students must use some type of media to make their product. With visual products, students not only need to synthesize their ideas into one, but also make sure it is a *readable* symbol. This means students need two additional skill sets (Anderson et al., 2001, p. 88).

Each media has its own inherent skills set. For example, if students use a software presentation, they need to be proficient enough with the software tools to design their product. However, visual media has its own skills that are needed to produce a readable product. Understanding how to visually communicate is visual literacy.

**Historical importance and significance of visual literacy.**

John Debes (1969) was one of the first to use visual literacy as a term. The body of research on visual literacy is multifaceted and extensive. It is not limited to digital media but appears to be growing with the influx of new digital technologies. Visual literacy includes a large body of research: culture and symbolism (Goodman, 1968; Messaris, 1998; Seppanen, 2006); communication (Boughton, 1986; Horn, 1998); digital instructional technology (Burmark, 2002; Horton, 1982); and cognitive science (Gardner, 2006; Eisner, 1991; Jensen, 2001; Pitler, Hubbell, Khunn, & Malenoski, 2007).

McDougall (2004) provided three conceptual categories to view these ideas about visual literacy. She defines them as structural, social cultural, and cognitive (p. 26). The
structural category of visual literacy involves the skill of communicating effectively through the creation of visuals (p. 37-40). Braden and Walker (1980), Debes (1969), Horn (1998), and McDougall (2004) claimed that visual literacy is a language with distinct parts. Horn (1998) described the language components as words, images, and shapes. The structure of visual language is dependent on design rules that include the effective use of color, layout, shape, and size.

The social cultural category of visual literacy teaches the viewer and creator that visual messages are not universal. Both the creator and viewer need to look at the message with the context of culture in mind. This requires the viewer to be able to recognize and read various cultural symbols. Eisner (1991) explained the ability to read cultural symbols as decoding and encoding. Decoding is the process a person goes through to translate symbolized information into his own experiences and thoughts. Encoding takes those thoughts and experiences and represents them in a symbolic form. Every culture is full of symbols from streets signs to the more complicated mass media forms of movies and music. Within each media, there are culture patterns. Norton and Wiburg (2003) described a literate person as someone who is able to navigate, learn, and profit from a culture’s media. The creators must know and understand their culture and design, to effectively communicate. The viewer must consider the cultural context when decoding the visual message. An example of a culture dependent perception is the interpretation of color. In Western cultures, white represents purity, while in Eastern cultures white signifies death (Burmark, 2002; Seppanen, 2006).
The second point to consider in the social cultural category of visual literacy is the idea of teaching students to be perceptive consumers (Burmark, 2002). Our world today is highly commercial and artificial. Teaching students to recognize bias and persuasion in advertising images is a 21st century skill (Ribble, 2009; Warlick, 2004).

These areas are addressed in the ISTE National Educational Technology Standards (NETS) and Performance Indicators for Students Standards (2007). These standards state: Students will communicate information and ideas effectively to multiple audiences using a variety of media and formats (p. 2). What is unclear is if teachers are aware of the NETS standards and consider them in their teaching pedagogy.

The Importance of the Teachers’ Narrative in Research

This study looked at eight teachers in two different schools, teaching third, fourth, and fifth grades, who were identified by their school’s ITRT as using the most VDLs. In an attempt to find out the reasons these teachers had adopted the strategy, I took a narrative perspective during the interview process.

Knowles (1994) and Beattie (2000) believe that a teacher’s pedagogy is shaped through personal experiences, personal stories, family history, peers, and culture. Teachers, like all human beings, tend to weave their experiences, their acquaintances, emotions, beliefs, and aspirations into narratives that guide the choices they make (Doyle & Carter, 2003; Santoli, 2009). Bruner (1990) said that to understand people, you must listen to the stories they tell. He explained that the autobiography retrospectively is simply “an account of what one thinks one did in what settings in what way for what felt reasons” (Bruner, 1990, p. 119). He goes on to say when studying people, “no one
‘explanation’ of man … make[s] plausible sense without being interpreted in the light of the symbolic world that constitutes human culture” (p. 138). To discover any connection between teaching VDLs and personal experiences, I asked the teachers about their family experiences in art and technology, personal interests and education in these areas.

**Teachers’ childhood experiences and interests.**

A small VDLs Research pilot study that I completed for EDRS 812 class requirement in 2007 suggested a link between teachers’ childhood experiences and personal interest (Negley, 2007). However the research of Beattie (2000), Berger, Coffman, Demorest, Humphrey, and Thornton (2001), Doyle and Carter (2003), Knowles (1994), and Smith (2001) shows the impact of teacher’s experiences and beliefs on their educational practices.

**Teacher’s professional educational experiences.**

Effective learning opportunities begin when a county and/or individual school communicates a clear vision of what it wants their teachers to know and do (Hammerness, Darling-Hammond, & Bransford, 2005). Shannon County communicated its vision through 20 hours of professional development classes. Although the county gave teachers some choice in the classes, each teacher must attend one each contract year. Many of these classes included examples of how teachers can help students actively process information through graphic representations. I provide a list of professional development classes and their possible impact to VDLs in Chapter 4 in the *Learning to See* section. Classroom observation provided evidence that teachers were influenced by these professional development opportunities. The influence of pre-teaching college
classes was evident in the interviews and observations of teachers who had recently completed college classes.

These teachers listed the ITRT as the biggest influence on their teaching. The significance of the role of the embedded coach is supported by the new National Staff Development Council Guidelines (2001). National Staff Development Council is now encouraging schools to restructure professional development to adopt a more constructivist approach. It acknowledges the expertise of teachers at the school level and believes that teachers working as a group of professionals can interpret student data to improve student learning (Killion & Roy, 2009). It recognizes that the job-embedded coaching model is an important component in the professional growth of teachers.

**ITRT change and teacher practice.**

The ITRT job, as I have described in Chapter 1, is an embedded coaching model with a purpose to change teachers’ practices to include instructional technologies. Shannon County’s Director of the ITRT program has adopted terms for change that Rogers (2003) uses in his book *Diffusion of Innovation, 5th Ed.* Since these definitions are how we think of our job and the teachers we serve, I list the terms for descriptive purposes. The terms I will be using are as follows:

- *Change Agent* – An individual who influences clients’ innovation-decisions in a direction deemed desirable by a change agency (Rogers, 2003, p. 473).

- *Innovators* – People who are almost obsessed with new innovations and new ideas. They tend to function outside of peer networks.
• *Early Adopter* – People who generally work with change agents when adopting the innovation.

• *Early Majority* – people who frequently interact with their peers and are possibly influenced by the early adopters to try the new innovation.

• *Late Majority* - people who make up one third of the members of any system and may adopt because of peer pressure, however, they are skeptical and cautious of the innovation.

• *Laggards* - people who must be certain that the new innovation will not fail before they adopt it. (Rogers, 2003, pp. 283-285)

Teachers in our county are aware that the ITRT role is to change their practice to include technology instruction in their teaching. This is significant for my study because of the relationship between the ITRT, Change Agents, and the VDL teacher.

As previously stated, the ITRT program started in Shannon County in 2005-2006. Since that time, the ITRT at Starwood Elementary School and I worked with the staff to encourage their technology use. In this role, we provided numerous professional development classes on how to teach content through various technology tools. We also looked for opportunities to work with teachers who were willing to allow us into their classrooms to model a tool’s use. Six of the teachers that allowed access that first year were in this study. (The two teachers that were not in this group were not at either school where the first the ITRT program was started.) The remaining VDL teachers were all early adopters. This finding prompted me to look into research on the reasons teachers adopt technology.
Buckenmeyer and Freitas’s (2005) research showed that “attitude toward technology was found to be the strongest predictor of teacher technology adoption and use, while having available resources and support was the most powerful predictor for stage of adoption” (p. 15).

Vannatta and Fordham’s (2004) study also listed teachers’ attitude, professional opportunities, and timely technology tool support.Marcinkiewicz (1994) stated that a teacher’s attitude toward computer use is related to their experiences, self-efficiency, and students’ results.

**Pressure.**

I expected that Shannon County’s focus on technology and 21st century would create feelings of negative pressure for these teachers. This was not true. Any pressure the teachers felt was categorized as positive. Several teachers did list family pressure as a reason to change. A late comer to Broadville Elementary School listed grade level pressure as the reason she changed.

**What Do We Not Know About The Problem?**

The purpose of my study was to explore why these teachers used VDLs. The hope is that this discovery will inform my development of a professional development course to encourage VDLs and visual literacy. A large body of research confirms the importance of visuals as an instructional tool in the classroom. Research shows positive results in the practice of using visuals to help students actively process information. However, few
studies have looked at how the elementary classroom teachers use VDLs as a product that includes visual literacy.

Most visual literacy studies for the elementary grades looked at the potential pedagogical implementations for the art room. I found one similar study, McDougall’s (2004), which looked at 26 primary teachers and how they were dealing with the mandated addition of visual literacy into the art curriculum. This study was set in Queensland, Australia. This study looked at K-5 generalist teachers’ own insights into how their conceptualization of and perspectives affected their use of VDL in their classrooms. McDougall reported that her participating teachers were not familiar with the term visual literacy. She also found that a teacher’s background and experiences played a pivotal role in the way they taught visual literacy.

McDougall quoted a few teachers who said that they were willing to try things outside of their comfort zone if they felt it benefitted the student. Her interpretation of these types of statements is that the teacher’s pedagogical belief facilitated the teacher's willingness to change. McDougall also listed school culture and peer mentors as positive factors in teacher adoption of change. The scope of McDougall’s study is different in that it looks at classroom teachers who were responsible for teaching the art curriculum in addition to the traditional content area subjects.

There is a large body of research about the benefits of visuals and digital media. However, there is a lack of research on what elementary teachers believe that students can and should learn about visual literacy when working with digital media in the elementary non-art classroom. There is a lack of research into how visual literacy is
taught through the VDLs, or for that matter, if it is taught. Therefore, an investigation into the reasons why and how teachers uses VDLs strategies with or without the inclusion of visual literacy was worthwhile.
Chapter 3. Methods

In this chapter I present my research methods for this investigation. The first section presents study goals, site selection, and participant selection. Next, I present the rationale for using a qualitative method and the approaches that guided it. I discuss my role as researcher, validity issues, and specific data collection tools. The chapter concludes with a presentation of methods, which I analyzed to present my data and the limitations of the study.

Research Goals

Intellectual goals.

I want to understand the reasons why these teachers use visual digital lessons, VDLs, in their classrooms. I want to discover how these teachers use VDLs as a tool to facilitate student learning. I want to identify what influenced these teachers to use this strategy with their students.

Practical goals.

My current job in Shannon County is to provide professional development to encourage teachers to increase their use of instructional technology. I believe the VDL is an important instructional technology tool. In my experience, there are two common
ways to use VDLs. One focuses on the process students use to visually interpret and/or elaborate content knowledge to improve understanding and retention. The second way uses student research, multiple resources, and cooperative project planning to create unique products. This second group is more likely to teach visual literacy.

While not all VDLs need the inclusion of visual literacy, I believe this skill has value. Visual literacy skills help students articulate their messages in images, symbols, and words. Often elementary teachers do not teach this skill because they have never been taught this skill and are unaware of its potential. Therefore, it is my hope that this study will help me improve the quality of my professional developments in the areas of VDL and visual literacy.

**Research Questions**

My research questions are:

1. What are the reasons these high-VDL-using elementary teachers use this strategy?
   a. How do these teachers’ reasons relate to their views of learning?
   b. How do these teachers conceptualize the advantages and limitations of VDLs?
2. How do these teachers actually use VDLs in their classroom?
3. How have these teachers’ education, experiences, and beliefs influenced their use of VDLs?

I used a qualitative methodology for this study. My primary interests were in learning from the teacher; her conceptualization of VDL, instructional decisions as it
relates to VDLs, and what may have influenced her VDLs practice. I used open-ended interviewing, observations, and follow-up member-checks as the data collection tools.

**Research Site**

**The school district.**

The study’s ultimate goal is to enable me to design a professional development program for visual literacy in Shannon County Public Schools. This district has a student enrollment of 24,246 students. It has 17 elementary schools with an elementary enrollment of 10,589. The county has an economically disadvantaged rate of 31%. The ethnic makeup of the school district is 65% white, 20% black, 3% Hispanic, 3% Asian, less than one percent Native American and 4% are unspecified.

The county employs 1,650 teachers. Of this number, 53% hold Master’s or Doctorate degrees. The average teaching experience is eleven years. Shannon County has a five-year-old program of ITRTs. The ITRT program provides embedded professional development to increase the teachers’ use of instructional technology. I have been an ITRT since the program started. Although Shannon County’s ITRTs are central-office based, the team holds no administrative responsibilities.

Shannon County Public Schools’ superintendent has emphasized the importance of instructional technology. Over the last five years, this county has increased the technologies available to its teachers. The county has installed a SMART Board and projector in each classroom. Laptop labs and desktop labs are available for teachers to
sign-out. Administrators encourage their teachers to use these technologies in their teaching strategies.

**School site.**

To limit the scope of the study, I chose two schools that were similar in size, socioeconomic status, and use and availability of the ITRT. By limiting the schools to Starwood Elementary and Broadville Elementary (pseudonym), I was able to provide a more in-depth picture of how teachers used VDLs. Because I am so familiar with the use of VDLs at the school where I work, I included this school. For the second school, I chose one that was similar in the areas that most affected instructional technology.

Each school’s enrollment was around 800 students. The school’s size is significant for digital instruction because it affects the availability of technology tools. The county allocated instructional tools on a per student ratio thereby attempting to provide equal availability of equipment throughout the district. Larger schools have more equipment and therefore more options in how it is distributed among their teachers. Since many principals allocate most of the schools instructional technology equipment to the upper elementary grades, third-fifth grade classroom teachers at these schools have more resources than their smaller counterparts. These two schools are among the largest in the county.

The ITRT role at the school was probably the most significant factor in choosing Starwood. Since the ITRT collaborates with teachers to develop instructional technology lessons, I wanted to pick a school where access to this resource was similar over the last five years. Many of the schools have changed ITRTs or share ITRTs. Because the
relationship between the ITRT and teachers is built on trust, a change in ITRT can slow
down a school’s progress in its instructional technology growth. A school that has had the
same ITRT without sharing this resource may have an advantage. For this reason, I
wanted to choose a school that was similar to my school in access to their ITRT.

Starwood Elementary’s ITRT access was the most similar to Broadville
Elementary. Both schools had the same ITRT for five years. Both schools shared their
ITRT with smaller schools during the first three years of the program. This influenced the
way the ITRT established technology leaders in our schools. Since the ITRTs could not
be at the schools fulltime, they set up informal technology leaders that helped teachers
when they were unavailable.

Starwood’s ITRT and I are among the most experienced educators on the ITRT
team. The Starwood ITRT has 31 years and I have 25 years of teaching experience. Most
importantly, we both have a long history of working with professional development in the
county. We focused on teaching the teachers instructional software and encouraged them
to be independent. We differ in our education teaching content-area experience. I was a
visual art teacher mostly at the elementary level with some experience at the middle and
high school levels. The Starwood ITRT was a middle school math teacher.

The socioeconomic status of the schools is important because many PTAs
purchase additional instructional technology equipment. This changes the resources
available for the teachers. A good indicator of the wealth of schools is the ratio of
students eligible for the National School Lunch Program, which is based on family
income levels. Because I used this number to assess the PTA ability to purchase
instructional funds, I went back to the previous school year. Broadville and Starwood’s
2008-2009 instructional purchases would have been made in May/June for the 2009-2010
school year. In 2008-2009, both schools had approximately 20% students eligible for the
free or reduced price lunch program.

The schools’ ethnic diversity is different. Starwood has a much higher rate of
student diversity. Its population has approximately 60% white, 30% black, and the
remaining 10% includes students of Hispanic and Asian descent. Broadville is
approximately 80% white, 12% black, and the remaining include students of Hispanic
and Asian descent. However, I do not feel that these differences impacted the way
teachers use VDLs. Both schools met federal annual yearly progress (AYP) last year, so
neither school was under the pressure of not meeting this goal.

After identifying Starwood Elementary as an appropriate site for the study and
securing the ITRT assurance that she could identify at least four high-VDL-using
teachers, I emailed the principal to request an appointment to discuss the study and the
inclusion of four of Starwood Elementary’s teachers. She emailed back within the hour
saying she did not require a meeting with me. The principal said, “[The ITRT]
recommended excellent teachers to you and I am in support of your plans.”

Participants selection strategy.

The selection of the teachers was an extreme case selection (Creswell, 2005, p.
204; Glesne, 2006, pp. 34-35; Maxwell, 2005, p. 90) that included only high-VDL-using
elementary teachers. I was only interested in elementary classroom teachers who used
this strategy when teaching non-art content, (English, Math, Science, and Social Studies).
I chose teachers who taught third, fourth, and fifth grade because they use the most VDLs. Starwood Elementary had 18 teachers working with these grade levels, and Broadville had 16 teachers working with these grade levels.

I identified four of the highest using VDL teachers at each school. Although this sample is not representational, these numbers allowed me to look at 22% of the third through fifth grade teachers at Starwood and 25% of the teachers at Broadville. The original sampling included two fifth grade teachers, two fourth grade teachers, and three third grade teachers. Table 3.1 shows the demographic profile of participants and VDLs. I added another third grade teacher at Broadville who taught visual literacy when I began to see a pattern in the inclusion of visual literacy in VDLs. Three of Starwood’s teachers did not include visual literacy in their digital lessons. Only one observation at Starwood included visual literacy. Whereas Broadville numbers were opposite, only one observation did not include visual literacy. Therefore, for the purpose of comparison I added another third grade teacher.

With the addition of the third grade teacher who teaches visual literacy, I now had a symmetrical comparison. The study of VDLs now had two third grade teachers who taught visual literacy and two that did not, one fourth grade teacher who taught visual literacy and one that did not, and one fifth grade teacher who taught visual literacy and one that did not.

I identified teachers who used VDLs on a regular basis. (For the purpose of the study, I defined “regular basis” as someone who used VDLs at least once a month or once a grading period.) Identification of the Broadville teachers was easy since I have
worked with them to help design lessons and distribute the instructional technology for the last four years. The ITRT at Starwood also identified her top VDL using teachers.

I emailed the study abstract to perspective teachers at Starwood Elementary and invited them to participate in the study. See Appendix A for the letter of invitation and Appendix B for the study abstract. I offered to meet with these teachers after school to provide additional information and answer questions. All teachers stated that they preferred not meeting and just wanted to use email for all correspondence. All invited teachers agreed to participate in the study. Starwood Elementary’s biggest concern was the amount of time needed for the initial interview. The ITRT at this school volunteered to cover their classes so I could do the initial interview. I conducted follow-up interviews directly after the observations and additional questions were emailed.

At my school, Broadville Elementary, I hand delivered the letter of invitation and discussed the study with the perspective participants. All teachers that I approached agreed to participate. I conducted interviews at Broadville before school started, during teacher planning, and directly after the students’ day ended. I used face-to-face and email for follow-up questions and member checks.

I used pseudonyms for the teachers, schools and the district to protect the identity of the teachers that participated in this study. See Table 3.1 for demographic data on teachers and their VDL use. All participant teachers were female. At Broadville, only 1% of the third through fifth grade teachers were male. Starwood had no male teachers at these grade levels.
Table 3.1.

**Demographic Profile of Participants and VDLs**

<table>
<thead>
<tr>
<th>Starwood Teachers</th>
<th>Years of Teaching</th>
<th>Grade Level</th>
<th>Subjects Taught</th>
<th>Report Use of VDLs</th>
<th>Actual Use of VDLs</th>
<th>Est. Total Hours *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andrea</td>
<td>8</td>
<td>Third</td>
<td>Math, Science</td>
<td>Monthly</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Bev</td>
<td>3</td>
<td>Third</td>
<td>L. Arts</td>
<td>Weekly</td>
<td>18 lessons</td>
<td>11.45</td>
</tr>
<tr>
<td>Caren</td>
<td>14</td>
<td>Fifth</td>
<td>Math, Science</td>
<td>Weekly</td>
<td>4 lessons</td>
<td>18</td>
</tr>
<tr>
<td>Paula</td>
<td>11</td>
<td>Fifth</td>
<td>L. Arts, SS</td>
<td>Monthly</td>
<td>5 lessons</td>
<td>9 **</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>9</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>12.82</strong></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Broadville Teachers</th>
<th>Years of Teaching</th>
<th>Grade Level</th>
<th>Subjects Taught</th>
<th>Report Use of VDLs</th>
<th>Actual Use of VDLs</th>
<th>Est. Total Hours *</th>
</tr>
</thead>
<tbody>
<tr>
<td>Charis</td>
<td>8</td>
<td>Third</td>
<td>All Content</td>
<td>Not reported</td>
<td>9 lesson</td>
<td>21 **</td>
</tr>
<tr>
<td>Carrie</td>
<td>21</td>
<td>Fourth</td>
<td>L. Arts, SS,</td>
<td>Weekly</td>
<td>6 lesson</td>
<td>19 **</td>
</tr>
<tr>
<td>Jessie</td>
<td>15</td>
<td>Third</td>
<td>All Content</td>
<td>4 to 6 weeks</td>
<td>6 lesson</td>
<td>24 **</td>
</tr>
<tr>
<td>Susanne</td>
<td>11</td>
<td>Fourth</td>
<td>Math, SS</td>
<td>Not reported</td>
<td>10 lessons</td>
<td>17 **</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>14</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>20.25</strong></td>
</tr>
</tbody>
</table>

Note. * Not Reported, L. Arts (Language Arts), SS (Social Studies)
* Unless teachers reported otherwise on the chart 1 day was converted to 1 hour
** VDLs that include visual literacy at least some of the time
Andrea.

Andrea was a third grade teacher at Starwood Elementary with 11 years teaching experience. She was an Early Adopter of instructional technology (Rogers, 2003). Andrea taught third grade for all of those years. In 2009-2010, she taught math, science and social studies to two classes. Andrea completed the work for a Master’s in Gifted Education in 2006. Andrea stated that she “saw the definite need and value of using the technology in teaching with students.” She listed her influences to use VDLs as her ITRT, a Visual Basic class she took as an undergrad, Multiple Intelligences, and Best Practice of student choice. During the 2009-2010 school year, Andrea was grade level leader.
Bev.

Bev was a third grade teacher at Starwood Elementary with three years teaching experience. She was an Early Adopter of instructional technology. Bev is the youngest participant in the study. Prior to 2009-2010 she had taught first grade for two years, where she taught language arts, math, science, and social studies. This was her first year teaching third grade. At this grade level, she only taught language arts to two classes. Bev stated that she missed teaching all the subjects. She also expressed feeling the pressure of being in an AYP tested grade level. Bev said that soon she would like to go back to college to get a Master’s but was not sure what specialty she wanted to pursue. Bev said she felt pressure to use instructional technology because it was expected of her. However, this pressure was a positive. Bev also stated that she felt she could meet more of her students’ needs by using VDL lessons.

Caren.

Caren was a fifth grade teacher at Starwood Elementary with 14 years experience. In 2009-2010, she taught math and science to two classes. In Rogers’ (2003) categories, Caren would have been classified as an Innovator. Caren completed her Master’s in administration several years ago. She was a mother of four boys under the age of 11. Caren stated that for this reason “if it doesn't get done within the school day I've learned to accept that it will wait till tomorrow.” She stated that one of the main reasons for using digital technology was that it made her job easier and more efficient. Caren allowed students to “contract out” of an activity if they could prove to her that they had already mastered its content. Students could then pick from a list of activities to extend their
learning. Many of these projects had digital visual components. For example, students could create an interactive board lesson on math skills and post it on the e-learning platform (ANGEL) for other students.

**Paula.**

Paula was a fifth grade teacher at Starwood Elementary with 12 years experience. She was an Early Adopter of instructional technology (Rogers, 2003). In 2009-2010, she taught language arts and social studies. Paula team-taught with Caren, so they shared the same students. Paula had two other successful careers before finishing her studies to become a teacher. Paula finished her Master’s in Education in 2004. This year, she was grade level leader for the fifth grade. Paula said that she used instructional technology and VDLs because of the value it provided to promote learning. Paula was the only teacher at Starwood that taught visual literacy. She told me at the conclusion of the study that our interview had made her aware of the importance of visual literacy, and she now planned to use this component more in her lessons. In fact, right after the interview, she set up a visual literacy extra credit folder for her students.

**Charis.**

Charis was a third grade teacher at Broadville Elementary with nine years experience. She was an Early Adopter of instructional technology (Rogers, 2003). In 2009 -2010, she taught language arts, math, social studies, and science. This year, her class had 28 students. Charis was the last member to be interviewed and observed for the study. I had not originally included her because she had two student teachers this year.
Charis also has two small children under the age of six, which made it difficult to find a time to interview her. (I previously discussed the change in my research design that resulted in the decision to include Charis in this study in the section Participants Sampling Strategy.) She stated that she uses the “computer pretty much for everything.” She feels that using VDLs keeps her from being “one of those teachers” who just lectures.

Carrie.

Carrie was a fourth grade teacher at Broadville Elementary with 21 years experience. She was an Early Adopter of instructional technology (Rogers, 2003). In 2009 -2010, Carrie taught language arts, science, and social studies to two classes. She stated that she loved instructional technology. Carrie was one of Broadville’s teachers who volunteered to participate in additional training for a laptop initiative in the county. This program introduced laptops at four elementary schools and evaluated the educational benefit to students at this level. The county claimed that this program was successful and rolled out laptop carts to all elementary schools the next year. Carrie finished her Master of Education Degree with an emphasis in social studies in 2008.
Jessie.

Jessie was a third grade teacher at Broadville Elementary with 15 years experience. Jessie was the only teacher in the study that falls into Early Majority category (Rogers, 2003). She described transferring to Broadville and feeling pressure from her third grade team to increase her instructional technology usage. This was Jessie’s fourth year at this school and fourth year teaching third grade. In 2009-2010, she taught language arts, math, social studies, and science. She also had 28 students in her class. Six of these students were identified with special learning problems. This year was a particularly hard year. One of her students was diagnosed with a brain tumor before Christmas and died in April. This obviously affected how she taught. She said that a combination of factors contributed to her using less VDLs this year. This year, Jessie was her third grade’s technology leader and Broadville’s teacher of the year.
Susanne.  

Susanne was a fourth grade teacher at Broadville Elementary with 11 years experience. She was an Early Adopter of instructional technology (Rogers, 2003). In 2009 -2010, she taught math and social studies. Susanne was a mortgage banker before she started to teach. She always used visuals in her teaching and slowly started to convert these lessons to digital lessons. Susanne said that what she does is “Commit myself to one type of technology each year. I try to get it under my belt to where I feel comfortable with it.” This year Susanne was her fourth grade’s technology leader.

Research Design

I selected a qualitative methodology for this study since my research questions were focused on understanding the reasons why and how these high-VDL-using elementary teachers use VDLs and on their background experiences, pressures, and educational influences. I used my EDRS 812 qualitative pilot study from in 2007 to guide the design of this study.

I used an open-ended interview approach (Creswell, 2005, p. 214; Maxwell, 2005, pp. 65-69) as one of the primary tools for this investigation. My second tool was observation. The observation depended on the length of the lesson and varied from a 45 minute one time session to 90 minutes for multiple day sessions. When observing teachers at Starwood, I usually arrived a few minutes early to make sure I had an opportunity to see their classrooms. This was especially helpful if the observation of the lesson was in the common computer lab. The computer lab at Starwood was set up for individual activity so all computers were
stationed along the wall. The classroom gave me a feel for how the teacher felt about a cooperative learning environment.

Finally, I collected any rubric, lesson plans, templates, and teacher examples the teachers had for the VDLs. Students’ activities/projects were the catalyst for the follow-up discussion on the lesson and the teacher’s objectives for the lesson.

My research design consisted of two interviews with participants. I conducted the first interview in the first semester of year 2009-2010 with the one exception of the additional participant, who I interviewed in May of 2010. The observations took place between October 2009 and May 2010. The follow-up interviews occurred either immediately after the lesson or within a few weeks. I kept field notes of my thoughts and transcribed them along with the observation for easy access and coding purposes. I listed data sources that I used to answer each research question in Table 3.2.

I completed the majority of the interviews and observations by the end of December. I began to read the transcripts of the interviews, observations, compared and asked questions of the data. I emailed to ask the teachers additional questions or to clarify statements. It was through this process of reading, comparing, clarifying, and questioning that I changed the design of my study. My original plan was to use only teachers who use VDLs that taught visual literacy. I planned to include one teacher who did not use visual digital lessons for comparison purposes. However, a pattern immersed that indicated the two schools’ teachers used VDLs differently, with one teacher at each school using the other type of VDLs. I saw that instead of studying visual literacy inside of VDLs, I had a comparison study of two ways to use these lessons. As I analyzed how the teachers used VDL without visual literacy, I saw that these lessons also had educational value. I also concluded that adding visual literacy to
these lessons, whose objective was for students to increase the understanding of one discrete skill, could be counterproductive. With this change in research design, I added an additional participant, Charis, to the study.

Table 3.2.

*Research Questions and Their Data Sources*

<table>
<thead>
<tr>
<th>Research Questions</th>
<th>Data Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>What are the reasons high-VDL-using elementary teachers use VDLs?</td>
<td>Open ended interviews 2009-2010</td>
</tr>
<tr>
<td>a) How do these relate to the teacher’s views of learning?</td>
<td>Observations of VDLs</td>
</tr>
<tr>
<td>b) How does the teacher conceptualize the advantages and limitations of VDL?</td>
<td>Field notes and reflections of interviews and observations</td>
</tr>
<tr>
<td></td>
<td>Teacher’s lesson plans, rubrics, lesson templates, and teachers sample activity or projects shown to students</td>
</tr>
<tr>
<td>How does the teacher actually use VDLs?</td>
<td>Observations of VDLs</td>
</tr>
<tr>
<td></td>
<td>Field notes and reflections of interviews and observations</td>
</tr>
<tr>
<td></td>
<td>Follow-up interviews</td>
</tr>
<tr>
<td></td>
<td>Member checks</td>
</tr>
<tr>
<td>How has the teacher’s education, experiences, and beliefs influenced her use of VDL opportunities?</td>
<td>Open ended interviews 2009-2010</td>
</tr>
<tr>
<td></td>
<td>Follow-up interviews</td>
</tr>
<tr>
<td></td>
<td>Member checks</td>
</tr>
</tbody>
</table>
**Data Collection**

The data collection tools I used included interviews, classroom observation, field notes, and follow-up interviews. These different tools provided different perspectives to help analyze my research questions and look for commonalities between the teachers.

**First interview.**

I scheduled an initial one-hour interview to explore teachers’ VDL theory, instructional methods, purposes, and influences. Since Starwood’s teacher interviews were held back-to-back with the ITRT covering the teachers’ classes I had to keep to this time schedule. At Broadville the interview time was more flexible since I had daily access to these teachers. The collected data provided insight into the commonalities and differences in participants’ experiences, education, and beliefs about VDLs.

The first interview was a data source for collecting the following information:

- How and why teachers used VDLs,
- How the teachers conceptualized VDL student products, and
- Possible links between teachers’ beliefs and experiences and the way in which VDL is used in their instruction.

**Observation.**

Observation and field notes were the second tool in my data collection. By including the teaching event and student project, I tried to think what was important and how it could answer my questions. The areas of most significance in the teaching event were the general teaching techniques, digital tips, visual tips, general classroom
procedures, and interactions with the students once the project begins. In the area of student projects, the important areas were the type of VDL project, its intended educational purpose, and how the product was evaluated.

I examined the data to see how the teachers used VDLs as an instructional strategy, structured the classroom environment, designed the instructional procedures, and created student projects. I used field notes on the teachers’ direct instruction on VDLs and visual literacy instruction. I collected and examined teachers’ artifacts such as rubrics, VDLs templates, teacher’s examples, grading sheets, and lesson plans. All of these components were clues that helped me understand the teachers’ perspectives and beliefs about VDLs. Since this approach called for me to construct meaning from the observed data, my approach to observation was one of generating (constructing) data instead of using a collective (excavating) approach (Mason, 2002, p. 88).

I used observations to collect additional information, gain insight into how VDLs fits in the large instructional picture, and find evidence to confirm or disprove the teachers’ interview statements. I analyzed field notes for the following items:

- How teachers organized and used VDL activities to enhance instruction?
- How teachers gave direct instruction, if any, to the students about ways to improve visual digital design?
- How teachers set up and carried out procedures for the VDLs. What was purpose of the final VDL product?
- Was it assessed as evidence of knowledge or/and was it used in student presentations?
To aid in the collecting, recording, and summarizing the observation data, I designed a matrix. See Appendix E. I divided the matrix into the following areas, setting, teaching event, student project, and artifacts. I developed the matrix categories using the work of Emerson, Fritz, and Shaw (1995), Mason, (2002); and Glesne (2006). Each category was designed to help me construct the data and see the patterns that emerged.

The *Data* category helped me focus on the *Who or What* areas. The *Description* category - *How, Where, and When* category helped me narrow down the exact particulars needed to answer the research questions. I added the How, Where, and When title to the Description category to help remind me of what type of details were needed when writing field notes. Emerson et al., (1995) provided me with some additional helpful hints. The authors recommend taking notes on key elements, significant impressions, and concrete details. They advised against writing about people in general terms and encouraged actively looking for the times when people exhibit behavior that is the exception to the emerging observed pattern.

The *Documentation – How will I know?* category was the artifact or field notes that I needed to collect. I added two additional categories, the *Research Question Importance – So What?* and *Member Check Needed* to the matrix. In the *Research Question Importance – So What?* category, I labeled each strand to show which question this data addressed. I believed by labeling the questions and linking them to the data collected, it would help me to see the connections between the items. I used the *Member Check Needed* (Creswell, 2005, p. 252; Emerson et al., 1995, pp. 142-169) category to look at the data collected and decide what areas I needed to address in the follow-up
interviews. I placed a check in this column if I felt that the data collected in the observation could have multiple or unclear meaning to me.

The *Artifact* category seems to be the most concrete. The physical evidence I collected in this study included teacher’s lesson plans and lesson examples, teacher’s templates, rubrics, and grading comments. Unfortunately, there was no similar artifact that I was able to collect unilaterally from all participants. Most teachers simply wrote notes in a lesson plan book for their lesson plans. Most lessons were not evaluated with a rubric, and for some, the grades were assigned directly into an electronic grading database.

To get a clearer picture of the scope of the teachers VDL lesson, I added an end-of-year chart. This required the teachers to fill in the following:

- Name of project & software,
- Time frame,
- Targeted 1 or 2 skills or culminating unit project,
- Individual, pairs, or group,
- Did you use a pre-made sample or demo?
- Was project graded?
- Was project saved?
- Was it displayed?, If so, in the hall or online?
- Was the product used in a presentation?
- Would you repeat the lesson next year?
Follow-up interview.

I conducted the follow-up interview after the observation. The purpose of this interview was two-fold. First, it provided additional data as to “how and why” teachers are using VDL. In addition, the follow-up interview it also served as a member check and helped establish the emic VDLs concepts categories of the teachers. I use the term emic here to describe developing “categories taken from participants’ own words and concepts” (Maxwell, 2005, p. 97).

Artifacts.

Student artifacts completed the data collection. I borrowed the approach used in Hetland, Winner, Veenema, and Sheridan’s (2007) research. In their study, researchers did not collect students’ projects, but used the students’ work collectively to evaluate how different techniques were expressed in different works. In the follow-up interviews, I used the students’ projects as a catalyst to ask teachers about their satisfaction with the results of the VDL. I asked them how the students’ products achieved their learning objectives, or why the lessons fell short of their learning objective.

Throughout the data collection, planning, recording, and summarizing, I used the matrix as a guide to help me answer the research questions. I recorded my thoughts in the field notes, observations, and memos. The data collection and the data analysis were ongoing (Coffey & Atkinson, 1996).

Research Relationships to Participants

I had two main concerns in developing the research relationships with the participants. The first one was my role as professional developer for the county. In this
role, it was possible I had provided educational opportunities for these teachers, thereby, perhaps influencing the teachers’ interview responses and lesson observations. A second and greater concern was my role as an ITRT. Since the role of ITRT is to influence instructional technology use in a school, this was a consideration in developing my research relationship.

At Starwood Elementary, my role of professional developer had little if any influence on the teachers. Only Caren said I “looked familiar.” Together we were able to place where we had met before. She had attended a county in-service where I had given a one hour Visual Literacy talk for a 20 hour Universal Design for Learning class. However, later in the interview, I asked if the Universal Design for Learning class had affected her instruction. She replied that she was able to pick up a few software and activity tips, but most of the information was not new for her. Caren did not speak about my visual literacy class and did not use visual literacy when she taught VDLs. However, all of Starwood’s teachers attended several sessions taught by their ITRT.

At Broadville, all of the teachers attended classes that I taught either before and/or after I became an ITRT. At Broadville, I chose teachers who did not hesitate to speak their thoughts, both positive and negative.

I decided that in the observation phases of the research, I would continue my role as an ITRT. I decided that this was the least intrusive research relationship during the observation. I lent a hand with activities and projects if asked. However, I limited my role to providing assistance to instructional technology questions and not VDL design questions. By walking this tightrope between assisting with the activity to be successful
and not altering the lesson design, I felt I created a partnership between the teachers and myself. I also felt it was less stress for Bev, the youngest teacher in the study. Paula was the only teacher who seemed to want me to limit my role in her classroom to just an observer.

**Data Analysis**

My study looked at the issues of how teachers conceptualized and used VDL and how this connects to a teacher’s beliefs, experiences, and education. I believed that the best strategy to help me develop my theory of what was taking place was to use a form of case study and process theory. These processes allowed me to look at the chronological and contextual connections between belief, experiences, and education and how teaching strategies change over time. In my pilot study, they also provided additional data for assessing the potential validity threats of my influence on the participants as a professional developer and change agent.

My initial steps in the analysis process were to listen to audio tapes and then transcribe the interviews. I transcribed the interviews verbatim. This process was time intensive and required me to play back the tape many times for accuracy in words and meaning. At the conclusion of the transcription, I listened to the tape one more time as I read my document to check the transcription.

I tried to complete each interview’s transcription before the scheduled observation. I felt that this prepared me for observation because the teacher’s words were fresh enough in my mind that I could call them up during the observation. However, since I interviewed all but one teacher before the observations, not only were their words
fresh in my mind, but it also was likely that the teachers designed lessons that were consistent with the way they described their VDL use. For example, Andrea talked passionately about allowing students to have a choice of media when demonstrating their knowledge. When I observed her, choice was prominent in her lesson design.

At the conclusion of the observations, I typed field notes of the lesson including little notes to myself about how this could be a tentative category or a link to something that was said during the interview. I wrote questions that I needed to ask the teachers to clarify my understanding. Since at Starwood the follow-up interviews took place as soon as the observation ended, I sent these questions to them via email.

Once the interviews and observations were completed, I reread and coded all transcripts and observation memos into interesting and informative data segments. I used these data segments to develop both etic and emic categories (Maxwell, 2005). Throughout this process, I repeatedly contacted participants for clarification as questions popped up. Once all data was coded, I listed all the categories and looked for commonalities between participants. After identifying these categories, I set up a matrix in an Excel document. Next, I opened each transcript and labeled the data segment with codes that had emerged for analysis. I copied the data segments into the matrix so I could easily compare categories. Themes emerged from these categories that I used to answer the research questions.

To answer the research questions “How do these teachers actually use VDL in the classroom?” and “How have these teachers’ education, experience, and beliefs influenced their use of VDLs opportunities?”, I felt it was important to preserve each teacher’s
context when comparing the connections between thinking, influences, and use of VDL. I used a strategy that integrates categorizing and connecting strategies (Maxwell & Miller, 2008). The categorizing strategy allowed me to look at each teacher’s data for ways it was similar or different to the other teachers. The connecting strategy allowed me to look at each teacher’s narrative for connections within her life-story and her use of VDL lessons. For example, Caren’s and Paula’s narratives suggested evidence of the link between early exposure to digital technology by their fathers and their early adoption of that instructional technique.

Throughout the data analyses, I continued to move between the interviews, observations, artifacts, and member checks comparing data sources and checking my understanding of the story that was emerging. I continued to ask myself how I might be wrong as I developed the categories and the themes for each question. In the following sections of the chapter, I describe how I analyzed each question and sub question.

**What are the reasons high-VDL-using elementary teachers use VDL?**

For teachers to teach visual digital learning, they must combine visual strategies and digital strategies. Since this is the case, I first asked the teachers about their reasons for using visuals, both digital and non-digital tools in their class. I divided the categories into reasons for visual strategies, digital strategies, and visual digital strategies.

Visual strategies categories were the visual learner, learning by seeing (includes teachers’ instructional methods), and learning by the creation of graphics. Digital strategies categories were technology’s benefit to teachers and technology’s benefit to students as a learning tool. Finally, I asked teachers what the benefits were when they
combined visual strategies and digital strategies into one strategy. Teachers agreed that when they used visual and digital strategies together, they increased student potential learning opportunities, increased engagement and motivation, and touched all of the students’ learning styles. The teachers agreed that using visuals in a digital media combined the power of both strategies.

**Sub-Question A – How do these reasons relate to teacher views of learning?**

To understand the above question I created a chart that listed the reasons for using VDL, teachers’ views of learning, and the participants. See Table 3.3.
Table 3.3.

*Teachers Reasons as They Relate to VDL*

<table>
<thead>
<tr>
<th>Reason for using VDL</th>
<th>Teacher’s Views of Learning</th>
<th>Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meets students’ needs through learning styles (visual, kinesthetic, and often auditory)</td>
<td>Teachers should accommodate students’ learning styles</td>
<td>All participants</td>
</tr>
<tr>
<td></td>
<td>Giving learners choices in media to express evidence of knowledge is best practice</td>
<td>Andrea</td>
</tr>
<tr>
<td>Helping learners understand by seeing (This category includes graphic organizers, pictures and photos, drawings, schematic illustrations, and models.)</td>
<td>Learning needs to be concrete – visuals help this.</td>
<td>All participants</td>
</tr>
<tr>
<td></td>
<td>Learners need to connect new knowledge with prior knowledge – use picture sorts</td>
<td>All participants</td>
</tr>
<tr>
<td>VDL improves students engagement and motivation in learning</td>
<td>Learning should be fun</td>
<td>All participants</td>
</tr>
<tr>
<td></td>
<td>Learners need to actively construct knowledge</td>
<td>All participants</td>
</tr>
<tr>
<td></td>
<td>Constructing knowledge is social</td>
<td>All but Susanne</td>
</tr>
<tr>
<td>VDL improves understanding and content retention through the process of creating a visual</td>
<td>Learners achieve understanding and content retention through process interpretation and/or elaboration on content</td>
<td>All participants</td>
</tr>
<tr>
<td></td>
<td>Learners achieve understanding and content retention through synthesis and creating original products</td>
<td>Carrie, Charis, Jessie, sometimes Paula</td>
</tr>
</tbody>
</table>
Sub-Question B - How does the teacher conceptualize the advantages and limitations of VDL?

Teachers designed and used VDLs differently based on their perceived advantages and limitations. Most of the eight teachers used both types of activities during the 2009-2010 school year. Lessons designed to help students process knowledge visually through interpretation and/or elaboration are labeled Process Focused. Lessons designed to allow students to research, plan, and organize their thinking into a unique product are labeled Product Focused. It is important to note that this is a generalization and within the two groups there were differences in how each teacher designed her lessons.

To understand how teachers generally view the advantages and limitations of these two types of lessons, I organized them into two tables. See Table 3.4 and Table 3.5.
Table 3.4.

**Advantages of Process Focused and Product Focused Lessons**

<table>
<thead>
<tr>
<th>Process Focused Advantages</th>
<th>Product Focused Advantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designed to target discrete skills - Building blocks to next activity or new learning</td>
<td>Designed to summarize multiple concepts into a unique product</td>
</tr>
<tr>
<td>Designed to easily assess understanding of students individual thinking</td>
<td>Designed to allow for social learning where students share thinking and ideas</td>
</tr>
<tr>
<td>Designed to be completed during one class time</td>
<td>Designed to extend student learning through sharing presentation of product</td>
</tr>
<tr>
<td>Designed to be used as interventions or enrichment depending on students’ needs</td>
<td>Designed to involve deeper cognitive process to create product</td>
</tr>
<tr>
<td>Classroom management is easier since students are all doing the same individual work</td>
<td></td>
</tr>
</tbody>
</table>

Table 3.5.

**Limitations of Process Focused and Product Focused Lessons**

<table>
<thead>
<tr>
<th>Process Focused Limitation</th>
<th>Product Focused Limitation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Designed for individual work – little social learning (Depending on teachers this was both an advantage and a limitation)</td>
<td>Time – students needed to plan, organize, and develop products – takes several hours</td>
</tr>
<tr>
<td>Activity is tightly structured with given set of elements - does not allow unique expression</td>
<td>Difficulty with classroom management, many different things are happening</td>
</tr>
<tr>
<td></td>
<td>Louder classrooms as students work together</td>
</tr>
</tbody>
</table>
**How does the teacher actually use VDL as an instructional tool?**

For this question, I developed the following possible categories before the observation process. These categories helped me understand how the teacher designed her lessons to meet her instructional goals. The categories were as follows:

- Instructional software used,
- Timeframe of lesson,
- Targeted 1 or 2 skills or culminating unit project,
- Individual or group,
- Teacher’s instruction technique (sample project and/or teacher templates),
- Whether or not the project was saved digitally,
- Purpose of product,
- Subject content,
- Environment, and
- Learning activity.

To have a clearer idea of how teachers used the VDL lesson throughout the year I asked them to fill out an end of the year use chart. See Appendix F.

I also attempted to categorize the activity for where it fell on the new Bloom’s Taxonomy (Anderson et al., 2001). An activity at the top of the taxonomy would fall in the Create category. Activities in the Create category were usually multiple day culminating unit projects. Activities that teachers designed to target understanding of one skill usually fell into a lower category.
Lastly I used the teacher’s interviews and observations to determine if the teacher used any visual literacy skills during teaching VDLs. Mostly teachers who taught this skill used lessons that were Product Focused.

**How has the teacher’s education, experiences, and beliefs influenced her use of VDL opportunities?**

For this question, I divided it into the areas of education, experience, and beliefs. These areas were further divided into coding categories for teacher’s education including college classes, professional development, and ITRT. The coding categories for teacher’s experience were former careers, hobbies, and childhood experiences. The categories for teacher beliefs were:

- Retention of knowledge,
- Evidence of knowledge,
- Value of visual learning,
- Visual learning by seeing,
- Learning styles,
- Digital instruction provides motivation and engagement increases effectiveness,
- Meets student needs, and
- Presentation device for learning.

These categories were interconnected with a teacher’s conceptualization and actual use of VDLs. To analyze how a teacher’s education, experiences, and beliefs
influence her use of VDLs, I looked for the connections between the categories and actual use. To see the categories more clearly, I created a second matrix in Microsoft Excel that displayed only the coded labels. For analysis connecting strategy, I used visual maps to illustrate relationships between categories. See Figure 3.1.
Figure 3.1 Visual Map of Connecting Relationships
Understanding my biases and reactivity and testing the validity of my conclusions.

The validity threats (Maxwell, 2005) to my study were my biases, reactivity, and inexperience. The tools to counter these threats were understanding my biases (Maxwell, 2005, p. 108), accounting for my reactivity (Glesne, 2006, pp. 125-127; Maxwell, 2005, pp. 108-109), rich multi-data sources, triangulation (Eisner, 1998; Mason, 2002; Maxwell, 2005), and member checks. I define how I use these terms later in the narrative.

Bias.

To offset my researcher’s bias in data analysis I looked for data that both confirms and counters my assumptions. Eisner (1998), Mason (2002), and Maxwell (2005), advised looking for the data that does not fit the puzzle and looks for alternative interpretations to my theory. Because of my educational background as an art educator and professional developer in the field of instructional technology, I believe that VDL is an important instructional tool. My original conceptual framework stated that VDLs should include visual literacy skills. However, as I analyzed the data and asked myself the question, “How might I be wrong”? I realized I needed to change my theory about visual literacy and VDLs.

My original research design was to select only participants who used visual literacy in their VDLs. Any participant who did not teach visual literacy would be either eliminated or their lesson would be used to compare to a lesson that included visual literacy. My original theory was that teaching VDLs without teaching visual literacy was missing an educational opportunity. However, as I looked at each case study by school
site and then compared them to the other school, I realized that the teachers within a school site taught similar to each other but differently than the other school.

Three of the four Starwood teachers of VDL never explicitly taught visual literacy. When I asked during the first interview if they used design tips, their comments ranged from “I will tell them to have fun with this and do what you want. Look around and see what others are doing” to “[students] figure it out on their own.” The observations of the lesson, the student projects from several lessons, and follow up question confirmed that these teachers did not teach visual literacy.

This made me reevaluate my existing theory that a VDL without visual literacy was lacking. I went back and looked at the learning that the teacher targeted through their lessons. I realized I needed to change my theory. Bev’s 18 VDLs were especially influential in my decision. On the last day of school, she sat down with me and shared her lessons. Bev designed each lesson to elaborate and extend the students knowledge of a discrete language arts skill. Bev taught only language arts and had a 45-minute block to work with. As I looked at her objective and timeframe of the lesson, I concluded that these lessons perfectly fit and targeted the identified skill. Adding digital visual literacy would not have added anything to the learning potential.

I now see that some VDL do not need visual literacy. It depends on the purpose of the VDL product. If the lesson’s objective is evidence of a student understanding of one concept, visual literacy may not be needed. However, if the objective requires students to use several elements that need to work together and function as one idea, visual literacy is needed.
Reactivity.

In the Research Relationship section of this chapter I discussed how my reactivity concerns were different for each school. Throughout the interview, I tried to avoid leading questions. I was especially careful not to use the term visual literacy. I asked teachers to describe any design tips they used. However, I know my presence did have some influence on the teachers. Several teachers told me that the interview and the question about visual tips made them more aware of visual components in their VDL.

The person I think who was influenced most from the interview was Paula from Starwood. She told me after our interview in October she made a visual literacy folder for her students. Her folder provided visual learning extra credit opportunities for her students.

The interview questions and my study abstract made teachers aware of my focus on the visual component of their VDL and affected the teacher’s choice of observation I was invited to see. One of the tools that I used to understand both the interviews and the VDL observations was the teacher’s end-of-year VDL chart. This tool allowed me to see the observation and interview within the scope of all of teachers’ VDL for the year 2009-2010. Because I was not able to conduct multiple observations at Starwood this tool was extremely valuable as I compared this site’s teachers to Broadville’s teachers, with whom I had an intensive and several year involvement. When possible the teacher and I filled out the chart together as we looked at students’ overall saved work. I had not planned this activity as a joint one. However, when I tested the chart on a Broadville teacher I discovered that I remembered more of her projects than she did. The only teacher I was
not able to work with completing or reviewing the chart was the only teacher who did not fill it out. By going through all the teacher’s lessons it provided me a much richer-data source to understanding the teacher’s use of VDLs. One of the teachers stated that she felt like this process was “valuable for her as well as she reflected on the year’s work.”

**Member checks.**

Member check is defined by Glesne (2006) and Maxwell (2005) as asking participants for feedback of data on ideas and analysis about your research. Member checks are a tool to improve the accuracy of correctly reordering and interpreting participants’ words. I used this tool during follow-up interviews, emails, and conversations to make sure I had accurately recorded and interpreted the participants’ words.

**Triangulation.**

I used verbatim-transcribed interviews, observations with descriptive notes of concrete events, numerous member checks, and multiple and varied teacher artifacts and student artifacts as a way to triangulate my data. Triangulation (Eisner, 1998; Mason, 2002; Maxwell, 2005) is a tool that I used to reduce my systematic bias. Maxwell (2005) advised researchers to collect data using multiple sources and methods to provide a better understanding of the issues and reduce the risk of systematic bias in my conclusions (p. 112). These researchers used triangulation not as the magic charm for gathering objective truth but as a way to understand data clearer, or deeper, or as a way to support or contradict other data. Mason’s (2002) idea of triangulation is to create building blocks that build evidence. Eisner (1998) looks at it as a way to find multiple data types that
support each other. For my study, I used teachers’ words, observations of lessons, teacher artifacts, and the discussion of student artifacts to show a clearer picture of what is happening. While triangulation did not eliminate interpretative and explanatory validity threats, it was a bit like looking at a sculpture from different views so that the whole figure can be appreciated.
Chapter 4. Results

The findings for this study look at the ways and reasons teachers use visual digital lessons, VDLs. Teachers shared common beliefs and goals about the educational value of using digital visual learning strategies. The teachers’ personal backgrounds and experiences seem to indicate a predisposed preference to the way they use visual digital technologies.

There were two distinct types of VDLs. I labeled them Process Focused lessons and Product Focused lessons. Process Focused lessons allowed students to process content knowledge visually through interpreting and/or elaborating. Product Focused lessons allowed students to research, plan, and organize their thinking by creating a product with a visual cohesive message.

Although the ways that teachers used Product Focused lessons varied, I only classified a lesson as Product Focused if the student’s outcome had a visual cohesive message developed through planning and research. Usually a Product Focused lesson is a collaborative and culminating unit activity that takes place over several days. Teachers who used Product Focused lessons frequently provide their students opportunities to share their creations with classmates and/or others. These teachers were more likely to teach visual literacy.
Process Focused and Product Focused lessons fall differently in Bloom’s (1949) Taxonomy. Anderson et al. (2001) revised the taxonomy’s cognitive process categories. These categories are now Remember, Understand, Apply, Analyze, Evaluate, and Create. Process Focused VDLs usually fall in the Understand category. Process Focused VDLs often improve learning by providing students with activities where they interpret information, usually words, into graphics. This act of interpreting information promotes knowledge transfer that helps students build connections between new knowledge and prior knowledge (Anderson et al., 2001).

Product Focused products usually fall into the Create category. These lessons are usually culminating and multi-day projects. Students use content knowledge from multiple resources to create a new original product. VDLs that use this strategy have built-in time for students to plan, research, and produce a product.

During the interviews and the observations, I found that these eight teachers fell into two types of VDL categories, Process Focused Group and Product Focused Group. See Table 4.1.

I categorized teachers as Process Focused if the majority of the time they spent using digital visual learning strategies, the following criteria held true.

- The teacher stated that the student goal for the VDLs was to clarify, extend, or improve recall and retention through the creation of a simple visual graphic.
- The teacher designed the VDLs to target only one or two discrete content skills.
• The teacher did not teach design strategies.

• The teacher valued the digital visual media for the process of graphic creation and the product was valued as evidence of knowledge and not an overall cohesive message to use by the student to present to peers.

I categorized teachers as Product Focused if the majority of the time they spent using digital visual learning strategies, the following criteria held true.

• The teacher designed the VDL to include the common components of collaboration, students group planning, research, design, and in most cases, presentation.

• The teacher VDLs were designs extended to the product’s overall message.

• The teacher shared design tips and how to create a cohesive message.

• Teachers valued the outcome as not only evidence of knowledge, but a communication tool for students to present to their classmates.

It is important to note that these groups do not totally describe the teachers’ use as many teachers used both types of lessons. They simply represent the teachers’ majority use. The use of these terms is to provide the reader with a better understanding of how and why teachers use visual digital lessons.
Table 4.1.

*Represents Teachers Type of VDL Use*

<table>
<thead>
<tr>
<th>Process Focused Lesson</th>
<th>Elementary School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Andrea</td>
<td>Starwood</td>
</tr>
<tr>
<td>Bev</td>
<td>Starwood</td>
</tr>
<tr>
<td>Caren</td>
<td>Starwood</td>
</tr>
<tr>
<td>*Susanne</td>
<td>Broadville</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product Focused Lesson</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Carrie</td>
</tr>
<tr>
<td>*Charis</td>
</tr>
<tr>
<td>*Jesse</td>
</tr>
<tr>
<td>*Paula</td>
</tr>
</tbody>
</table>

* Indicate use of both Process and Product lessons. Paula split her VDLs’ time almost evenly between the two types. She completed five VDLs for a total of nine hours in the 2009-2010 school year. Her one Product Focused lesson accounted for five of the hours.

The findings for the study contain themes that connect to teachers’ reasons, goals, and uses of VDLs as strategy. The themes provide insight into the understanding of the three research questions. The coding categories based on the participant responses are presented within the research questions. I discussed significant exceptions to the similarities in teacher’s beliefs and uses of VDLs. I also include in the chapter any educational literature that may have influenced the teacher’s beliefs and uses. To review, the research questions that guided this study were:
Research Questions

1. What are the reasons these high-VDL-using elementary teachers used this strategy?
   a. How do these teachers’ reasons relate to their views of learning?
   b. How do these teachers conceptualize the advantages and limitations of VDLs?

2. How do these teachers actually use VDLs in their classroom?

3. How have these teachers’ education, experiences, and beliefs influenced their use of VDLs opportunities?

Why High-VDL-Using Elementary Teachers Use This Strategy.

For teachers to teach visual digital learning, they must combine visual strategies and digital strategies. Since this is the case, I first asked the teachers about their reasons for using visuals, both digital and non-digital, in their class. Next, I asked the teachers why they used digital strategies in their classroom. Finally, I asked why they combined visual strategies and digital strategies in VDLs.

Reasons for using visual strategies in the classroom.

All of the participating teachers stated three common beliefs about the importance of using visuals as an educational strategy. First, they stated that using visuals in various ways meets the needs of students who are visual-learners. Secondly, teachers talked about how students learn better by seeing. Susanne said, “[Students] learned better through visual representation and going from the concrete to the abstract in that progression.” Therefore, they believed using visuals to teach new content is important. Several teachers
said that they also were visual learners. Third, teachers expressed the belief that the process of students creating just visual representation improves learning. It is important to note that the teachers’ comments in this section are their beliefs about the use of all visuals strategies, not necessarily digital visuals.

**Individualized instruction for the visual learners.**

While discussing why they used visuals in the classroom, six out of eight teachers mentioned the term *visual learners*. Caren commented, “I'm a visual learner. I need to see it and hear it on my own.” Paula stated, “I'm finding that a lot of children are visual -- more to the visual-kinesthetic. [I found] very few kids are auditory learners exclusively.” Charis stated, “Because that is the type of learner I am. I always make that connection with my kids. [I tell them] that if you have to know about it, I’m going to try and show you.” These teachers used the term visual learners in the context of a preferred way of processing information or a learning style.

Shannon County Public Schools accepted the importance of visual, auditory, and kinesthetic (VAK) learning styles in students. This is evident because of the many workshops that have VAK theory embedded as part of the content. Teachers are encouraged to design lessons that motivate learners of different styles. Principals, while viewing lesson plans, often look to see how teachers are accommodating these various modalities. Stahl (1999) reported that a large majority of teachers believe it is appropriate to take into account students’ individual learning styles to provide unique learning opportunities for each of the VAK modalities. Finding ways to help all students achieve is especially important in the current AYP climate.
Students learn better by seeing.

Each participant commented on the importance of students seeing some type of visual representation to understand. Andrea said, “Ultimate goal of using visuals is to create that picture in their mind that they can draw from to help them understand.” Jessie said, “I think it really gives more meaning to what you are trying to teach. Paula says, “Students need to be exposed to a variety of materials in a variety of ways -- visuals helps you understand.”

In this county’s quest to provide teachers with the various tools they need, it instituted a Professional Development Department in the 1990’s. This department approves and oversees the delivery of all county workshops. Although few workshop descriptions include helping teachers teach visually, I am amazed at how many of these courses have content that does just that. It was also apparent as I interviewed the participants that unless they had just completed a university course, they were not likely to mention theoretical literature as an influence. Instead, the influences they mostly discussed were school-based workshops, peers, and coaches. Killion and Roy’s (2009) work on teacher training recognized this trend in schools.

To look more closely at the eight participants’ influences, I have listed a short description of the influences that the participants mentioned or I observed. I will include a deeper discussion of these influences within the context of each case study.

Since the county tightly controls professional development, I am starting with the first weekend train-the-trainers session. In 1998, the county sent their handpicked cadre of approximately thirty professional developers, all county content supervisors,
principals, and teachers, on a weekend to discuss Jensen’s (1998) book, *Teaching with the Brain in Mind.* Jensen’s book set the stage for the learning that would take place for the next decade. The book tied neuroscience and educational research together. It gave insight into how brains process information through multiple senses (Rose & Meyers, 2002). Being an art teacher at that time, I was especially excited that Jensen (1998) also encouraged “the use of art not just to draw but to teach thinking” (p. 38). Our responsibility as trainers was to spread the word that students need to hear and see information to effectively process content (Jensen, 1998).

In 2005, Language Arts workshops were held at the elementary level. Teachers were encouraged to adopt *Words Their Way* (Bear, Invernizzi, Templeton, & Johnston, 2004) into their practices as they taught reading. This approach encouraged, along with other things, picture sorts for students to learn sounds and words. At the same time, social studies workshops encouraged teachers to use primary resource visuals to tell the story. Teachers were encouraged to design student projects where visuals were used to analyze historical content and improve memory retention (Shoob & Stourt, 2008; Vest, 2005, Wyman, 2005). Mathematics workshops encouraged teachers to have students picture and draw math problems (Leinward, 2007).

The above professional development influences were either mentioned in the interviews or I saw them in the practice of the participants. Jessie stated that both county professional development classes and her peers influenced her instruction. She said she strongly believes in the value of visuals. Jessie stated, “I think that kids can remember more when they have that picture in their mind to go back to later. ‘Oh yeah, I remember
seeing a picture of that.’ So I think it really gives more meaning to what you are trying to teach.”

Creating visual symbols improves content retention and understanding.

Another reason given for using visuals is the belief that when students create visuals it improves content retention. Paula said, “You're going to remember what something looks like if you have to draw it!” Carrie said,

I think it really helps students remember the facts and information that they're expected to learn. They are actually applying that information to something that they can visualize, rather than seeing it on a flash card and memorizing what it means. They are actually putting it in a picture -- applying it by explaining it.

Andrea said,

Each person's visual is going to be different … so my symbol or visual might not help you remember what the word means but it's going to help me remember what it means. That is the ultimate goal of using these visuals, to create that picture in their mind so that they can draw from it to help them understand.

Two teachers expressed a strong belief that the process of creating visual symbols for content retention and understanding was especially helpful for special education students. Jessie said, “I always teach special-needs kids, and it's so important for those children to have the visual to be able to process.” Paula said,

Honestly, I believe that those visual things help special education students process. It helps them get that material more than traditional ways. I know that no
matter what level you are teaching the visual helps them to understand and process information better.

Susanne believed that the reason students had improved content retention and understanding when they created visual symbols was because it involved higher-level thinking. Susanne said, “It takes it up higher in the Bloom’s.” She believed that allowing students to visually synthesize information helped them work at the top of Bloom’s Pyramid. As previously discussed, Create is now on the top of Bloom’s Taxonomy (Anderson et al., 2001). “Create involves putting elements together to form a coherent or functional whole. Objectives classified as Create have students make a new product by mentally reorganizing some elements or parts into a pattern or structure not clearly present before” (p. 84).

I think it is important to note that Create is not described as creating a product “outside of the box.” It is instead creating a product that links to the student’s previous understanding and extends that understanding to include new information and the creation of a unique product. The teacher’s expectation guides this process. It requires that students think creatively and produce “inside the box.” While only one teacher listed this as a reason for using visuals, I will describe several teachers who create such learning opportunities in the section “How teachers taught using VDLs.”

Reasons for using digital strategies in their teaching.

When I asked why these teachers used digital technology in their classrooms, the reasons fell into two categories, the benefit of technology as a teacher tool and the benefit of technology as a student-learning tool. Six of the teachers listed a variety of ways
technologies saved them time. All observed teachers listed engagement and motivation as the reasons they use technology with their students.

**Benefit of technology as a teacher tool.**

I divided this category into three subcategories; benefits to teachers’ time, convenience in grading, and communication to parents. A surprising find of my research was that the teachers listed using digital strategies as a time saving tool for them. In retrospect, this makes sense. As an ITRT, it is what I hope all teachers someday will feel. However, the feedback I often received in the hall from teachers is usually about time lost when technology goes wrong. The preliminary data of the current study on the impact of technology in Shannon County Public Schools showed high regular use of teacher-tool-technologies during planning and/or teaching (Galluzzo, 2010). See Table 4.2.
The sample pool included low, middle, and high technology using teachers. Each ITRT identified three teachers from their schools that fell into the above categories.

In my study, six of the eight participants believed technology made teaching easier. Caren spoke the most passionately about technology and teaching. She stated, “I began to get involved with all the technology, the visual and the digital, more out of self need.” Caren is a mother of four young boys under the age of eleven. She said,

If it doesn't get done within the school day, I've learned to accept that it will wait till tomorrow. … Grading could get done when I have my classes do things and put it in a [digital] drop-box. I didn't have to carry home stacks of paper. … It

Table 4.2.

*Technology Tools Teachers Regularly Used*

<table>
<thead>
<tr>
<th>Tool</th>
<th>Number Answered</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANGEL – e-learning platform</td>
<td>137</td>
<td>87%</td>
</tr>
<tr>
<td>IG Pro – Online Grade book</td>
<td>116</td>
<td>74%</td>
</tr>
<tr>
<td>Email</td>
<td>139</td>
<td>89%</td>
</tr>
<tr>
<td>Desktop Computer</td>
<td>140</td>
<td>90%</td>
</tr>
<tr>
<td>Desktop Computer/laptop</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SMARTboards/Interactive</td>
<td></td>
<td></td>
</tr>
<tr>
<td>White boards</td>
<td>147</td>
<td>94%</td>
</tr>
</tbody>
</table>
made my life so much easier. … I just really went for it, and it was like “why isn’t
everyone doing this?"

The digital grading tools are new tools to Shannon County. The county introduced
the online grade book within the last ten years and the e-learning platform (ANGEL),
which includes the digital drop-box, four years ago. The only teacher tool that is
mandated is our online grading book. Teachers who teach third through twelve grades
must use this system.

All but one teacher spontaneously discussed how they used ANGEL to improve
communication with parents. Jessie said “I think [ANGEL] has been helpful. I talk about
ANGEL more and more to parents. I tell them, ‘I am putting resources online, good study
guides, and things that kids lose along the way. Some of the websites your kids can go to
for practice.’ And more and more, I see that parents are using that. I think it has saved
time.” Paula said, “The communication piece is what makes [ANGEL] fantastic. I have a
lot of parents who do go into ANGEL with their student and look at what they [children]
are doing and check up on things.” Only Charis expressed concern that her parents did
not check this resource enough this year.

All eight teachers discussed how using technology made it easier to create and
share instructional materials. Paula said, “It is a timesaver benefit that it gets created once
and it can be saved and I can use it over and over again. … Things don't take up as much
space because it is all digital.”
Benefit of technology as a tool for student learning.

I divided this category into four subcategories to show how teachers described the reasons they used this classroom strategy. The categories were:

- benefits to students,
- engagement and motivation,
- connecting to the kinesthetic learner, and
- teaching 21st century skills.

All participants believed that instructional technology can motivate and engage students. Bev said, “They really like it, and they get so excited with it. The more I can have them excited and participating in what I'm talking about, I feel like the better they will learn it.” Caren said, “I find that when we are doing [technology] we do not have the behavior issues because the kids are engaged.” Jessie said, “If I could just keep a computer going all the time, maybe I can keep their attention. I've noticed a difference with the computers there to do a project. They are working so hard, and that's been the greatest thing.” Jessie’s current classroom had 28 students, which included 13 students who had Individual Educational Plans or suggested modifications to accommodate the learner.

A final consideration for these teachers is the county’s focus on 21st century skills as defined in the Learning for 21st Century Skills (2002). Our county’s mission statement reads “Preparing Students to Excel in a Dynamic Global Society.” Our website and county communication to parents is full of references to the importance of preparing students in the 21st century through the use of instructional technology skills.
Shannon County leadership wants teachers to be aware that this increasingly digital world should change the dynamics of their classrooms. The participants, by their words and actions, accepted the county position that the 20th century factory model school needs to change. Jessie explained the reason she does digital cooperative projects. It is “extremely helpful for these kids to get this experience because that is the real world. So whether or not it helps answer the question on that SOL test, those SOL tests aren't going to help them in their life.” Susanne said, “Using technology turns [students] from being passive to active learners.” The use of technology tools tends to move a classroom from the traditional model of the teacher always in the front of the classroom (Pitler et al., 2007). Charis said,

I think [using technology] definitely affected my teaching style. I feel like it has made me very hands on. … I think it gets you out of being that teacher who comes in and just uses the textbook. You know that kind of teacher! … It really gets you away from ‘Okay, look at textbook page’ and the ‘We are going to do this workbook’.

**Benefit of using visual digital strategies in their teaching.**

Earlier I discussed the reasons teachers used visual strategies and digital strategies. Most elementary teachers use visual strategy in their weekly instruction. However, not all teachers embraced digital strategies in their instruction. I selected these teachers because they combined visual strategies and digital strategies in VDL. They are a minority in the county, and I would like to see the use of this type of lesson grow. I believe that the reasons that teachers use this approach are the first steps in understanding
how to develop a professional development course that encourages others to adopt this approach.

I asked these teachers what they believed were the benefits when they combined visual strategies and digital strategies into one lesson. They agreed that when they used these two combined strategies, they increased students’ potential learning opportunities by increasing engagement and motivation and touched all of the students’ learning styles. These teachers believed that using visuals within a digital media compounds the instructional power of lessons.

Carrie said,

It just compounds it. It gives it a three-dimensional quality, not just a flat piece of paper. Pictures, posters, and things are flat learning. Here you've got movement, you've got sound, you've got things that make it rounder, you know, it gives it more flexibility. More in-depth, or whatever, and now you have … a different dimension with this. They can now not only see it, they can move it, and they can hear it.

Susanne summed up these teachers beliefs with this comment, “I get more bang for that lesson when it is a visual and when it is using technology”.

A teacher’s perception influences how she/he uses technology with students (Zhao & Cziko, 2001). If a teacher uses technology with goals and purpose it can be an effective tool to increase student learning, understanding, motivation, and achievement (Schacter, & Fagnano, 1999). A teacher’s beliefs or convictions can influence how well their students learn, even those who may be difficult or unmotivated (Guskey & Passaro,
These teachers shared the belief that VDL was an important tool for student instruction.

**Reasons these teachers used VDLs relate to their views of learning.**

To see how these teachers related to their views of learning, I created a table that looked at the teachers’ reasons for VDL and their views of learning. See Table 3.3 located in the Methods chapter. These teachers shared six common views of learning. They were:

- Teachers should accommodate students’ learning styles.
- Learning needs to be concrete and visuals help with this.
- Learners need to connect new knowledge with prior knowledge.
- Learners need to actively construct knowledge.
- Learning should be fun.
- Learners achieve understanding and content retention through process interpreting and/or elaborating on content.

All six of these views of learning are embedded themes in the county’s professional development classes. All eight teachers provided evidence of their beliefs through their interviews and observations.

There were three views of learning that were not commonly shared by these teachers. These were:

- Giving learners choices in media to express evidence of knowledge is *Best Practice*. 

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• Constructing knowledge should be social.

• Learners achieve understanding and content retention through synthesis and creating original products.

**Choice as a view of learning.**

Andrea was the only teacher who designed her VDL to give students a choice in the media they used to show evidence of knowledge. Andrea stated that she believed it was Best Practice to use student choice in VDLs. This is rare at the elementary level. In my 21 years experience as both an ITRT and an elementary art teacher, I have never before seen a teacher use a lesson design that gave young students a choice among three digital media choices and a traditional drawing choice. Often elementary teachers give students media choices for a home project. However, lessons completed in school usually involve all students using one or at the most two software programs, thereby making classroom management easier.

The ITRTs teach the importance of choice during the course called *Universal Design for Learners*. In this class, we encourage teachers to offer students a choice in their production of knowledge. However, the choice we talk about is more an “either/or” decision. For example, a student might choose between digital or non-digital forms of expression or between a written paper and three-dimensional project. Andrea’s observation lesson was not designed this way. She said that her Master’s in Gifted Education influenced the way she used choice in her VDL. She said.

In taking gifted education classes at UMW, Dr. Adams (pseudonym) was a proponent of allowing students some freedom in choosing how they express their
knowledge. As a student of Dr. Adams, she afforded us the opportunity to choose how we demonstrated our knowledge, and I greatly appreciated it.

Andrea gave students the choice of working with traditional drawing materials, the software programs Pixie, or PowerPoint, and the website Wordle.net. The lesson was a culminating unit project on Ancient Rome. Each student created a collage that covered Ancient Rome’s physical characteristics, human characteristics, architecture, government, sports and the arts. Andrea stated the goal for the lesson “was to provide a spot check of the students’ understanding”.

Andrea taught this lesson to two classes. Each class had approximately 20 students. None of the students chose traditional drawing tools for the collage. One student used a PowerPoint, and the rest of the students split their choices evenly between Pixie and Wordle.net. I asked Andrea why she thought the students mostly picked Pixie and Wordle.net. She believed that most of the students made their decision based on their familiarity with the tools. Andrea said that the boy who used PowerPoint had learned how to use this tool in a Gifted program.

Most of the students who used Wordle.net represented all the required Ancient Roman categories. (See Figure 4.1 for an example of a recreated student project.) Wordle.net is easy to use. The program allows you to type the words into an input box, press the Create button, and the program creates the collage. Students changed the layout by clicking the Randomize button. The program then creates various layouts, fonts, and font colors. The user can control the size of a word. The more times you type a word the
larger it will appear. The most common words students emphasized were their own name, Rome, Italy, and Ancient Rome.

![Figure 4.1. Recreated Student Project Using Wordle.Net](image)

All students who used Pixie to create their collage depicted only one of the five required characteristics. I recreated a typical student activity, shown in Figure 4.2. In this example, the student was depicting Ancient Rome’s human characteristics. A figure labeled “farmer” held a bunch of grapes and stands beside what appeared to be a stalk of corn. Two additional figures were drawn and labeled traders. They were standing on a
gray box labeled concrete. I believed the student used this box to represent Ancient Roman builders. No mention was made of the four remaining characteristics.

Figure 4.2. Recreated Student's Collage Done on Pixie

Andrea expressed disappointment that the students did not cover all the topics in their collages. Since the students had printed and not saved their activity, she was going to return the printed activity the following day for them to add the additional categories with pencil.

This was the first time Andrea had used this lesson. When I asked if she would use the lesson again, she wrote,
I will use this lesson in the future with a few changes. I will provide the students with a checklist of items to include. I would also like to break the project into two parts. I would teach about the physical characteristics, human characteristics, and adaptations first. The students would then create a visual focusing on those items. I would then go on to talk about art, architecture, and government. The second part of the project would be to create a visual regarding the latter three aspects. When doing a project that is comprehensive of much material studied, I feel the students would benefit from breaking it into two distinct parts.

I asked Andrea if this was typical of her lessons, she said it was “somewhat atypical”. Usually her lessons “used Pixie sorts and traditional drawing to reinforce subject content”. She went on to explain that, “most of [her] lessons using digital visuals tend to focus on certain aspects of what we are studying instead of being a comprehensive assessment”. The lessons she described were much more characteristic of Process Focused VDLs. She did not complete the end-of-the-year VDL chart, so I do not know how many of her 2009-2010 projects were designed to include choices.

I believe that since Andrea described choice in the interview as being a necessary component of Best Practice lessons, this influenced her use of choice in the VDL I observed.

*Socially constructed knowledge.*

Susanne expressed concern about allowing students to work in pairs or groups to socially construct knowledge in a VDL. When I asked her what her preferred way of teaching VDL was, she immediately said individual activities. She commented, “It is just
that they're little still. Collaborating and coming up with consensus is not usually a skill that they have. … I think they got more out of what they do themselves. So, I do like the single projects.” Although Susanne expressed a preference for individual projects, she does other activities, such as skits, where the students were involved in group learning.

The majority of teachers designed Process Focused VDL lessons for independent learning. However, Caren and Bev spoke to me of the importance of allowing students to work together to solve content problems. Bev said,

[Students] like to talk [to each other], and they can learn different things. It was funny, the other day they were doing a workstation, and I heard this one explaining it to another one. He was just explaining it in a different way so that kid could get it.

Even though these teachers’ end of the year charts for 2009-2010 showed a preference for individual style VDLs, their classrooms were setup to facilitate group interaction. Their room design indicated that social interaction was an important part of their learning environment.

How laptop carts were distributed seemed to have no real effect on how teachers used VDL. This was not what I expected. Starwood assigned one cart of 12 or 13 laptops per every two teachers in the third and fifth grades. The total laptop carts available to the school were 11, ten carts of 12 or 13 laptops and another one of six laptops. Third and fifth grade shared three carts, one per two teachers, and fourth grade shared two carts, one per three teachers. The rest of the grade levels shared the remaining two carts. This arrangement was to encourage teachers to design collaborative activities. Since teachers
had one laptop cart that they shared with another teacher, students needed to work in pairs or take turns. All four of Starwood’s teachers talked about using the laptops in both of these ways. A desktop lab was also available to sign out. The design of the computer lab was for individual learning with all computers lining the wall.

Broadville had 13 laptop carts. Two of these carts had 15 laptops. The remaining carts had 12 or 13. However, instead of assigning teachers to a cart, the teachers could sign up for any cart or carts as needed. Although Broadville encouraged teachers to have students working in pairs or groups, the ultimate decision was theirs. With the difference in the way that laptop carts were shared at the two schools, I expected that Starwood’s teachers would design more pair and group VDLs. This was not the case. Three of the Broadville VDL teachers used pair and group projects more often than any of the Starwood teachers. See Table 4.3. Each school’s teachers reported using VDLs 29 times. At Broadville, 31% of the VDLs were designed to be pair/group activities. This compared to 24% of the time at Starwood.
Table 4.3.

*Percentage of Pair/Group Projects*

<table>
<thead>
<tr>
<th>Broadville Teachers</th>
<th>Pair/Group VDL</th>
<th>Individual VDL</th>
<th>Percentage of Pair/Group VDLs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carrie</td>
<td>3</td>
<td>3</td>
<td>50%</td>
</tr>
<tr>
<td>Charis</td>
<td>3</td>
<td>5</td>
<td>37.50%</td>
</tr>
<tr>
<td>Jessie</td>
<td>3</td>
<td>2</td>
<td>60%</td>
</tr>
<tr>
<td>Susanne</td>
<td>0</td>
<td>10</td>
<td>0%</td>
</tr>
<tr>
<td>Total Lessons</td>
<td>9</td>
<td>20</td>
<td>31%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Starwood Teachers</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Andrea</td>
<td>No data</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Bev</td>
<td>3</td>
<td>15</td>
<td>16.67%</td>
</tr>
<tr>
<td>Caren</td>
<td>2</td>
<td>3</td>
<td>40%</td>
</tr>
<tr>
<td>Paula</td>
<td>2</td>
<td>3</td>
<td>40%</td>
</tr>
<tr>
<td>Total Lessons</td>
<td>7</td>
<td>22</td>
<td>24%</td>
</tr>
</tbody>
</table>

*Content understanding and retention through visuals.*

I believe the teachers’ view of learning affected how they designed VDLs. All of these teachers used at least one Process Focused lesson. See Table 4.4. Their VDLs indicated a belief that students understood and retained knowledge through visual interpreting and/or elaborating content knowledge. How these teachers viewed the learning potential of the VDL project seemed to have been influenced by the views of the IRT in that school.
Three of the four teachers who used the Product Focused VDLs were from Broadville. See Table 4.1. I believe that these teachers were influenced by the value I placed on the product of the VDL. I taught art education for nineteen years and value VDL products as educationally important. As part of my current job, I model and suggest lessons in all subjects for the teachers. Most of the lessons I suggest involved the creation of visual products with cohesive messages. When possible, I include visual literacy tips to improve the message. As previously stated, I teach visual literacy not only at my school but also at the county level.

I saw a similar influence at Starwood Elementary where three of the four teachers used Process Focused lessons. The remaining Starwood teacher, Paula, who I included in the Product Focused Group, spent five hours working on one Product Focused lesson and four hours on four Process Focused lessons. She spent one hour more on Product Focused lessons in 2009-2010. I found the Starwood teachers’ preference for Process Focused lessons particularly interesting since their ITRT is the county’s main Marzano trainer. Marzano (2007) believes the value of visuals is in the creation process. The process of a student encoding and decoding content to create a content symbol improves his understanding and makes it more likely he will retain that knowledge.

I believe that Starwood’s ITRT and I influenced the teachers we serve not just with our expertise in instructional technology but also with our educational theory as well. When teachers request help, we work with them to design any instructional technology activity. It makes sense that in the design of the technology instructional lesson that we add the educational theory that we believe is important.
The advantages and limitation of VDLs.

All of these teachers stated the common advantages for using VDL as increased motivation and engagement, increasing student understanding and retention, and providing evidence of knowledge. For all of the teachers in the study the biggest advantage was the motivation and enthusiasm of the students. Bev put it like this, “[Students] love it! They get so into it. You can see them interacting with each other, especially with the laptops they are, like hey, look at this or look at that.” Susanne said, “[Student] behavior and engagement – It is just like a total change [for the better]”

These teachers also believed that the VDLs help students do well on the unit test and SOL tests. Jessie stated, “It helped them remember the content. The project we are working on now and the one before, related to science and social studies, and I think it really helps them remember the facts and information that they're expected to learn.”

Charis reflected on her end of the year VDL project that reviewed the Famous Americans before the SOL test.

I had a 97% pass rate. I had all but one child pass the SOL. There were really a lot of famous Americans that are covered typically. I know that that's one of the things that is a big SOL for us. Of course, there was a lot of other content because you have all the K-3 [Social Studies content] but they knew it. They knew the famous Americans.

Carrie told me how well her students did on their American Revolutionary unit test after their Product Focused lesson. “The grades for the test on the American
Revolution were some of the highest I have had, and I think this lesson had a great deal to do with that.”

These teachers often linked positive behavior and engagement with VDLs. Caren said, “We do not have the behavior issues because the kids are engaged. They know that I've set up the expectations. The technology is too expensive for them to be goofing off.” Caren went on to say, “I've had children that … were not behaving appropriately and were making the lesson difficult for everybody else so they've moved to the book. They've only had to do it once and then they come back.”

Charis was the only teacher who did not list behavior as a positive outcome of the VDL. However, when she was talking about student negative behavior, it was linked to the most commonly talked about limitation of VDLs, technology failure. Charis explained it this way. “[I feel] frustration when everything is not working. … [I] have to worry about the behavior. That is usually when [I] lose them.”

Susanne saw the limitation of malfunctioning instructional technology as costing her time and energy. Susanne explained this way, “It takes time, and you have to have Plan B. It takes a lot of energy from me to be able to change a lesson into Plan B and still have it be a good one.” The possibility for technology not working correctly is a common obstacle in its use. This is often the reason teachers ask for the ITRT to help with their technology lessons.

Susanne also mentioned the fact that losing time was a concern. Most of these teachers saw time as a limiting factor in some way or another. Time is a valuable resource in the current AYP-driven culture. Bev agreed. “The time, it is too short!” She
indicated that time influenced her use of short individual Process Focused lessons. Her lesson targeted a discrete skill instead of the more time involved Product Focused lessons. She said, “I want [students] to make their own things. I just have to figure out the time when I can work with them, and I don't have to be pulling [students] for small group instruction.”

Bev designed 15 of her 18 VDLs for instruction during the Intervention/Enrichment block. The Intervention/Enrichment block was new to Shannon County Public Schools in the 2009-2010 school year. The county designated 45 minutes each day where elementary teachers were required to meet and remediate or enrich individual students or small groups based on their need.

The challenge for the teachers was how to do this within a classroom of approximately 20 students. Teachers needed to plan activities that had the dual purpose of enrichment or remediation, and be engaging enough for students to work independently while they worked in another part of the room with other students. No new content could be introduced at this time since students needed to complete the activity without the teacher’s help. Bev’s solution to this problem was to use activities that extended the morning lesson. She was then able to pull groups of students and work with them while the rest of the class worked on computers. The digital and visual part of her lesson was engaging enough that students were able to work without her immediate attention. Although Bev expressed the desire to have students work on a unique Product Focused lesson, I believed that she found an excellent way to use Process Focused lessons.
Charis reported in her end-of-year chart that she used three Process Focused lessons and six Product Focused lessons. She stated, “I feel like [Product Focused lessons are] necessary in order to prepare the kiddos for the real world. …However, if and when time becomes an issue and I feel the pressure of not having things taught the first time, I would shorten or get rid of [VDL] as culminating project. I would try to find an alternative solution.”

Jessie also expressed a concern with time. She does mostly Product Focused lessons. Her lesson on the continents took two weeks to complete. Jessie expressed the stress of this investment of time. She explained, “I feel the pressure of what I am doing cutting into my time. I sometimes even question whether I should finish the project. Am I going to hurt some other area?” Jessie went on to say, “Which is going to be more helpful? I worry about the SOL, about the benchmarks, and [VDLs] probably isn't the most helpful in helping them pass that test. But in the long run, life skills and what lies ahead is definitely the most helpful.”
Although time was a factor in all of these teachers’ VDL use, the investment of time for a Product Focused lesson is much greater. See Table 4.4. The average Product Focused lesson took almost five hours to complete. Notice that Susanne’s two Product lessons took seven hours while her eight Process lesson took thirteen hours. Product Focused lessons take much longer because they include planning, researching, and cohesive message products. The investment of time in Product Focused lessons required the teachers to believe this project had a great value to their students either because of improved test scores or for the real world experience.

Table 4.4.

*Compare Times of Product Focused and Process Focused Lessons*

<table>
<thead>
<tr>
<th>Teachers</th>
<th>Product Focused Lessons</th>
<th>Process Focused Lesson</th>
<th>Total Hours</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number of Lesson</td>
<td>Hours involved</td>
<td>Average Per Lesson</td>
</tr>
<tr>
<td>Broadville</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carrie</td>
<td>5 of 6</td>
<td>22</td>
<td>4.4</td>
</tr>
<tr>
<td>Charis</td>
<td>5 of 8</td>
<td>18</td>
<td>3.6</td>
</tr>
<tr>
<td>Jessie</td>
<td>4 of 5</td>
<td>23</td>
<td>5.75</td>
</tr>
<tr>
<td>Susanne</td>
<td>2 of 10</td>
<td>7</td>
<td>3.5</td>
</tr>
<tr>
<td>Average VDL Time per Teacher</td>
<td>21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Starwood</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Andrea</td>
<td>No data</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bev</td>
<td>0 of 18</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Caren</td>
<td>0 of 5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Paula</td>
<td>1 of 5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Average VDL Time per Teacher</td>
<td>12.92</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Broadville teachers spent a total of 84 hours on VDL lessons for an average of 21 hours per teacher. Starwood teachers spent 38.75 hours on VDL lessons for an average of 12.92 hours. (I did not include Andrea’s time since I do not have the end-of-year VDL chart for her.)

**How the Teachers Actually Used VDL in the Classrooms**

There were several differences in the use of Product Focused lessons and Process Focused Lessons. As stated above, Product Focused lessons involved a greater amount of instructional time. These projects require time for students to plan, research and create. Therefore, these lessons are used less often. Process Focused VDLs usually target one or two skills. The precision-targeted Process Focused lessons can be stepping-stones for more additional knowledge to come. Because of the time and simplistic nature of the content, teachers can use this type of lesson more often. It is important to note that I believe both types of VDLs have educational value. Both types of lessons serve a different objective.

Another difference is how the VDL product is used. For both groups the product was an assessment tool to evaluate students’ learning. However, in Product Focused lessons, these teachers were more likely to use the product as a catalyst for students to explain and present their learning to their peers. These teachers told me this had value for the students presenting as well as the students listening. Charis said when I asked her why she had her students present their content project.

So that [students] would pick up anything that I missed along the way because we have to teach everything so fast and at such a rapid pace. … And then to give
them more knowledge. It wasn’t all stuff that they had to know but it was
something that the kids felt like it was meaningful enough that they and I learned
a lot. Truthfully, I learned a whole lot from the continent research project.

In this project, Charis designed it so that four or five students were assigned a
continent. These students had guiding questions to help them do their research in books
and online. They created a presentation and used it to teach their peers.

The Product Focused teachers were more likely to use visual literacy skills in
their lessons. I believe this is because this group saw the students’ learning continuing
past the product creation into the presentation. Since students used their products to
present or teach their peers, students needed to make sure their visual message was
cohesive and clear. For example, during my observation of Charis’s class, two girls were
sharing their presentation of Betsy Ross. Their presentation included a picture of a
dolphin on a slide about Betsy Ross living in Philadelphia. Charis immediately stopped
the girls and asked, “What was your reason for dolphins on this slide?” The girls
answered that they just liked dolphins. She told the girls, “Remember your pictures and
your words go together. They say the same things, but in different ways.” On the girls
grade sheet she made this comment, “Remember your pictures should always relate to the
information that you are trying to present. Dolphins had nothing to do with Betsy Ross
and Philadelphia.”

Another consideration when students were presenting their work to their
classmates was reading ability. Carrie, Charis, and Jessie in the lessons I observed
reminded students repeatedly to make sure your fonts are readable to the audience. They
were referring to the font style, size, and color. Paula reminded students that, “fonts can be used to communicate different messages. Some fonts make things look excited while others make things look very official, while still others look sloppy.” She instructed students to make sure they used fonts that would help them communicate one overall project message.

**Teachers who used Process Focused Lessons.**

The teachers who designed VDLs to enhance learning through the visual creation process shared several common lesson design components. Their student activities targeted one or two discrete skills or concepts. The teachers evaluated the products only on evidence of knowledge and not design elements. The teachers primarily designed VDLs as individual activities so that assessing students’ knowledge was easier. This held true even if students shared laptops.

The four teachers in the Process Focused Group were Andrea, Caren, Bev, and Susanne. The VDLs I observed were all individually completed, and the teachers’ lessons did not include visual literacy. Three of these lessons were completed within a class period. Caren’s lesson was the exception. Her lesson was a multiple day lesson with several parts. The first day of her lesson was completed, printed, and graded. See Figure 4.3. Later she extended the learning and allowed the students to go back to the template and elaborate on the learning by adding the appropriate fauna and flora. A detailed description of this activity is included in the next section of Caren’s story.
To better understand how each teacher used Process Focused Lesson, I have provided their individual stories and an overall view of all observed lessons by teacher group.

Caren.

Caren taught fifth grade science and math at Starwood Elementary. She used VDL Process Focused lessons, three in science and two math. Three of the project activities were completely individual and these were graded.

Caren loved technology for what it can do for her and her students. She also valued visual learning. Caren said, “Visual and the digital hits everybody, even my LD [learning disabled] kids. It hits all learning levels.” Caren designed visual digital learning activities so that the product would show evidence of students’ knowledge. Since she wanted to assess the outcome, she designed individual activities that targeted a unit concept. This was sometimes a challenge since she shared one computer cart of 13 laptops with another fifth grade teacher, Paula.

The observed activity was atypical of Caren’s VDLs. It targeted one discrete skill. Students needed to correctly identify and label the features of the ocean floor. This lesson included the challenge of working around the available technology. The students used desktops in the lab and shared laptops in their classroom to create individual graphics over a three-day period. On day one, in the computer lab, students used a pre-made template of the ocean to drag and drop labels on the correct parts. See Figure 4.3. Once completed, students printed these digital handouts and turned them in for a grade. On the following two days, they shared a laptop in their classroom to add the correct flora and
fauna to the ocean’s levels. Students completed this task by taking turns on the laptop. Finally, the students recorded their voices explaining the reason for their choices. The only collaboration was when the students “practiced their script” before recording their explanation. The teacher did not re-grade the activity after the inclusion of graphics.

Figure 4.3. Premade teacher template

Caren used the product in this lesson to create a second review lesson. Along with the ocean floor product, students added additional slides that covered all of the Virginia SOL 5.6 ocean content. This lesson was a multiple day lesson, and students worked in pairs. However, this project was a Process Focused Lesson since the students did not
create a product with a clear cohesive message. Information from the slides came directly from student review sheets and books. Caren describes the activity below:

[ITRT] created a document for me that had all the concepts that the students were required to know and understand (I posted this on ANGEL). I let the children partner up with who they wanted and they began to come up with the best way that they wanted to share the information...at the end we put it all together into a movie. I didn’t give them any [design] limits...just that they needed to have correct information for the review.

Since the activity’s purpose was a review and not an assessment, students worked in pairs. The final project reviewed all the required content. The small font size in their movie made it difficult to read. Some pages showed the students’ expertise in technology by including interesting animations and tricks. Caren did not offer design tips to students during the creation of either activity.

During the October interview, Caren predicted that she used VDLs once a week. However, her end of the year chart listed only five VDLs. The discrepancy between her beginning year prediction and her end of the year list may be attributed to several factors. During the interview, Caren discussed the fact that she taught each lesson with the interactive board. During this time, she had students take part in the instruction by drawing visual representation on the interactive board. She may have included this activity as a VDL. Caren also allowed students to do additional independent projects, which often were digital in nature. Lastly, this was an unusual weather year. Shannon County was closed for twelve days due to snowfall.
Bev.  

Bev taught third grade language arts at Starwood Elementary. All of her 18 VDLs were Process Focused and in language arts. Of these projects, 15 were individually completed and 13 lessons were graded. Bev was in her third year of teaching and explained that her reason for using digital visual activities was to meet the needs of her students. “I just try to meet all their needs and take an interest in them.” She stated that the digital component of the lesson motivated her students because “they love to work on computers”.

Bev was the youngest teacher in the study and the only teacher who taught just language arts. Most of her activities were teacher created templates that targeted one discrete skill. Bev also used the time that students worked on computers as her Intervention/Enrichment block. See previous description in this chapter on The Advantages and Limitation of VDLS to see how Bev used VDLs during the Intervention/Enrichment time.

I was able to observe one of Bev’s typical visual digital lessons. She used software that allowed her students to create drawings and use clip art and text to complete the activity. The students divided their digital screen into four sections and illustrated the singular and plural words. Bev introduced the concept that morning, and this activity served as evidence of the students’ understanding. When the students finished the activity, they printed it and turned it in for a grade. See Figure 4.4.
Another example of one of Bev’s visual digital lessons that targets one discrete skill is her compound words activity. She had the students use a paint and text software program to illustrate their understanding of this concept. One student typed and illustrated the words “cave”, “man”, and “caveman”. A plus sign between “cave” and “man” and an equal sign before “caveman” visually demonstrated that the student understood this compound word. Students drew and typed the pictures and words on a white background that resembled a math problem. See Figure 4.5.
Since Bev’s objective was that her students demonstrate understanding of the targeted skill, the design of the outcome was not important. This activity was also printed, graded, and displayed in the hall.

**Susanne.**

Susanne taught fourth grade social studies and math at Broadville Elementary. Susanne did ten individually completed VDLs; two were Product Focused lessons and eight were Process Focused lesson. The subject areas covered in the lessons were two language arts, six social studies, and three in math. All but one lesson was graded. These activities used seven different types of software. She used the most software tools of any of the other teachers in the study. Susanne used visual digital media as a way for her
Students to elaborate and process content information. Susanne stated, “I am a big advocate for taking knowledge and using it to create. That is how I think it becomes their stuff versus just everything else.” This is evident in the way she used visual digital media as a strategy with her students.

She stated that digital visual activities create learning opportunities where “students have to think critically, make choices, command technology, and evaluate their own learning”. Susanne believes that one of the other benefits is that the “students received immediate feedback from the outcome”. Once the activities were finished, she graded them and hung them in the hall. Susanne stated that displaying these activities was motivational to her students. She said, “I feel that students are more careful with their projects if they know they will be displayed. They take more pride and are more thorough.”

Susanne’s observation was typical of her math VDLs. She targeted the specific skill of a growing pattern. Students used visual digital software to identify, describe, and create a growing pattern using four slides. Once the slides were completed, they saved them as a movie with audio that described the pattern. See Figure 4.6.

Like the previous two teachers’ activities, the lesson objective was application of knowledge to produce evidence of knowledge. The layout of the product was immaterial therefore, Susanne did not share design tips.
Susanne evaluated the activity for its completeness, whether a student followed all directions, and the inclusion of a typed explanation of their pattern.

Susanne used a total of ten VDLs. Susanne designed these learning opportunities as ways for the students to apply basic new knowledge of a target skill or a unit. Eight of these projects were Process Focused and individually completed, with formative assessments. The remaining two lessons were Product Focused multi-day culminating projects. Students presented one of these lessons to their classmates.
Andrea taught third grade math, science, and social studies at Starwood. Andrea said that she used VDL for both science and social studies. The lesson I observed was Process Focused and it was graded. This lesson was also discussed in this chapter under Choice as a View of Learning. In the observation lesson, Andrea designed this activity so each student would create a visual collage of the six targeted SOL areas in Ancient Rome. Andrea gave students the choice of working with traditional drawing materials, the software programs Pixie, or PowerPoint, and the website Wordle.net. Students could use words and pictures to create the collage. However, if students wanted to use both words and pictures, according to her direction they had to use a tool other than website. Andrea encouraged students to use media tools that they were comfortable with since they had 45-minute period to complete the activity.

Andrea said that a Master’s class influenced her use of student choice during lessons.

She explained,

I gave students the freedom of choice in the tool because some students freeze up when asked to draw. Also, we all learn in different ways, so I want students to learn what works best for them in terms of them expressing their knowledge. In the formal academic arena, students are almost entirely reliant on formal testing to assess their knowledge, SATs, and SOL tests. As teachers, we recognize that there are multiple ways to demonstrate knowledge. I feel it is Best Practice to allow
students some freedom in the tools they use to express the knowledge they have gained in class.

Andrea reported that she has students create visual representations once during every social studies and science unit. Third grade science and social studies units are about a week in length. Teachers rotate the teaching of these subjects throughout the school year. Andrea predicted that she designed visual lessons digitally only a third of the time. Andrea did not complete an end of the year project sheet so I have no way to confirm her estimated activity use.

**Educational literature and the visual digital learning creation process.**

These four teachers believed that the power of VDLs is in the process of creating that symbolic visual representation. They believed that by designing the lesson to utilize the computer they enhanced the motivation quality for their students. They believed by combining the visual and digital components, in Susanne’s words, it “increases the bang for their buck”. The bottom line for them was the belief that the more motivated and engaged students are with the lesson content the more they would understand and remember content. In this VDL design the purpose of final product is often assessment.
Teachers who used product focused lessons.

The teachers who designed VDLs also shared several common design components. Their lessons were mainly culminating unit activities. The lessons were frequently collaborative and occurred over multiple days. The lesson usually included time to plan, research, design, and develop the message of the product. These lessons ended with the students presenting their final product to the class. Usually the teachers referred to these activities as projects. The projects’ products might take the form of a newspaper, brochure, presentation or a movie. Because of the investment of time, teachers who instructed using this type of activity, did it less frequently. These lessons usually included visual literacy skills.

The four participating teachers in the Product Focused Group were Carrie, Charis, Jessie, and Paula. Their lessons included visual literacy instruction. These VDLs were all culminating, multi-day, pair or group projects. Carrie included an individual component in her group project. The teachers also assessed these projects for evidence of knowledge. Teacher assessed projects differently; some issued an individual grade based on the student’s participation and some teachers issued one group grade for all.

Carrie.

Carrie taught fourth grade social studies and language arts at Broadville Elementary. All six of her VDLs were in Social Studies. Five were Product Focused lessons; three of these students presented to the class, of these two were group projects. She said, “I think children learn better by looking and I can see what they know by their
drawings. If they can relate what they talk about by putting it in the picture, then I know they understand.”

The observed activity was typical of Carrie’s VDLs. She explained, “I have always used visuals with my students and have them create various things to help cement the knowledge. This creation has become more in tune with technology.” The project was a collaborative, culminating, five-day lesson. To start the lesson she showed students her project sample. Carrie asked the students to critique her sample for design. Several students pointed out that some of the font was too small to read. Carrie immediately used this as a teachable moment on how important it is to use the correct font size and color.

Carrie demonstrated how to use a combination of clip art and free drawing to design symbols and graphics. Students worked in groups of four or five students to plan and create a ten-page movie that reviewed the eight “Reasons the Colonists wanted to Revolt”. The movies included a title page, eight reason-pages, and a credit page. Students decided which individual “reason slide/s” they wanted to do. They used the textbook and notes to research content during the planning and creation process. Finally, the students put the slides together and added the narration and transitions.

The difference in this lesson was the amount of instructional focus she placed on the final design of the product. She continually helped her students edit the image to represent a unified message. Once students began to create, Carrie continually circulated and talked to the students individually about their designs. She repeatedly asked, “What is the meaning of your slide?” “How does this picture fit into the message?” She reminded them several times “This is a visual representation. Don’t use a lot of words!”
She repeatedly asked the students to think about the choices they made while designing. Students used a combination of clip art, free drawing tools, and words to explain the reason that some American colonists revolted from England. I recreated a typical sample of a student’s reason graphics. See Figure 4.7.

When the groups’ individual reason slides were completed the students worked as a group to organize the reason slides, title page, and credits into a movie. The students then added narration to each slide that explained the graphic and the reason for revolt.

The final step of this project was the students’ presentation back to the class. Carrie said, I think sharing projects helps validate the effort the students put into their project. They like sharing what they have done, and it is a way to cement the knowledge I hope they gain by doing the project. [Students] also get to see how other people thought about the subject and expressed their ideas. This gives them ideas for the next time they do a project. Students can reinforce learning by sharing and gaining knowledge from the sharing with classmates.
Carrie assessed the lesson with two different grades. One was a group participation grade. She based this grade on two things--how well the students worked together and if their final project had the correct information represented. The second grade was an individual grade based on the student’s slide/s. She evaluated the project on accuracy of information, meaning clarity of the visuals representation, and mechanics of spelling and proper punctuation.

Carrie did six culminating projects this year, one for each grading period. Carrie had said in her interview that her ultimate goal for students was to create something as often as possible. She did not predict how often she would use VDLs during the interview. All but two of her projects were culminating group projects.

Figure 4.7. Recreated Example of a Student’s Reason Slide.
Paula taught fifth grade social studies and language arts at Starwood Elementary. She used five graded VDLs in both social studies and language arts. Three of her lessons were designed for students to complete individually and two in pairs. Paula almost evenly split her time between Process and Product Focused lessons, with just one hour more in a Product Focused lesson. Four of her five lessons were Process Focused. Each of these lessons took approximately one hour to complete. Her one Product Focused lesson took five hours to complete. I struggled with where to place her, in Process Focused Group or Product Focus Group. Time was the deciding factor. Time is an educator’s most valuable resource and her investment of time in this one project spoke to the value she placed on the product of the lessons. Paula also spent approximately a third of the initial instructional time in the Product Lesson on visual literacy tips.

Paula was a strong proponent of using visuals with teaching. “You're going to remember what something looks like better if you have to draw it.” The VDL I observed was a five-day project that taught multi-genres of writing. One of the goals for the VDL was for students to understand that different types and kinds of writing blended into the newspaper. However, the newspaper was not just about genres. The product was to communicate one overall cohesive message.

Paula designed a digital newspaper template for students to use. See Figure 4.8. She demonstrated how to use the software before the project started. Paula explained that students would work in pairs to plan, research, and create a newspaper on a winter topic of their choosing. Students were to start by planning their four-genre newspaper project.
Each paper had to include four genres. Students chose four of the following: poem, list, factual newspaper story, special interest story, recipe, how-to articles, and songs. Each paper had to have a heading and one graphic illustration.

Paula reminded them that although each pair’s newspaper had multiple genres, it must communicate one thought. Paula taught visual literacy tips by brainstorming ways for the students to communicate messages. She discussed how font type and color communicate a message to the viewer. She asked the students what different colors could say. She asked, “What might the color blue represent?” Students answered that the color blue could represent water, calm, snow, and ice. Paula asked, “What could the color red
represent?” The students suggested fire, Washington Redskins football team, anger, blood, stockings (since this is the week before Winter break I’m sure they were thinking red stockings by the fireplace hung for Santa), and hot sauce. She did not confirm or deny any of the students suggested answers.

As soon as students began to work, Paula began to circulate to help students with questions, writing, and editing. Editing included tips for each pair’s newspaper. The bulk of this project was writing so most of the questions concerned different types of writing.

Paula graded the project with a rubric that looked at the composition, written expression, mechanics and usage, genres, overall appearance/neatness and voice recording. The category of overall appearance/neatness relates to visual literacy. In this category the evaluation criteria for full credit was “Overall appearance is excellent. Work is neat and includes appropriate graphics. Little or no formatting errors are evident.”

In Paula’s October interview she predicted that she used VDLs about once a month. Her end of the year project list shows five, three individual activities and two group projects.

Jessie.

Jessie taught third grade language arts, math, science, and social studies at Broadville Elementary. Her VDLs included four science lessons and one language arts lesson. Four of the lessons were Product Focused and were graded. Three of the Product Focused lessons were completed in pairs and all were presented to the class.

Jessie’s observed VDL was a five-day geography project. Students needed to research and create a presentation or brochure about their assigned continent. The
research tools for this project were online encyclopedias, references books, and textbooks. Students needed to include information about the continent’s landforms, rivers, populations, flora and fauna, climate, and governments in the presentation. She told the students that this list would serve as a type of rubric for evaluation.

This class had a wide range of reading and writing ability, therefore Jessie designed two separate projects. She assigned students and paired them by reading ability. Students that were not reading on grade level were provided with an information sheet as well as the other resources to help them research. These students created a presentation which required them to write less. The teacher created a template to guide the students through researching and creating slides for their presentation. See Figure 4.9.

![Deserts](image-url)  
*Figure 4.9 Recreated Slide for Students Showing Limited Writing Needed*
Students that read on grade level researched, and designed a brochure that required more text information. Jessie showed students how to use a Microsoft brochure template and discussed how a brochure should be laid out. This discussion included what should be on the front, middle, and back of each brochure. See Figure 4.10.

Figure 4.10 Recreated Example of Student Project Using Brochure Template

Antarctica

Antarctica is at the bottom of the world.

Antarctica is windy and dry. It is very cold.

Antarctica is the coldest continent.

Penguins live in Antarctica!
Jessie stated that her first objective was to have each pair reinforce their basic continent knowledge, as well as learn additional information about their continent. She stated, “Using technology and having the visuals was such a meaningful way, especially for students who would otherwise not be engaged, for my students to learn the material.” She stated her second objective was to give the students the experience of teaching and speaking in front of one another. Jessie said, “I believe that students need to understand how to present instead of saying, ‘I put a picture on the front...’ Plus she said, “It is also important to celebrate the accomplishments of the students.”

In the interview Jessie predicted that she used VDLs once every four to six weeks or about once a grading period. In her end of the year VDL projects list she reported that she completed five projects, one in each grading period. Out of the five projects, three were paired projects and two were individual projects. Students presented all but one of their projects.

*Charis.*

Charis taught third grade language arts, math, science, and social studies at Broadville Elementary. Charis’ eight VDLs were two language arts lessons, four social studies lessons, one science lesson, and one math lesson. Five lessons were Product Focused. Five were individual projects, two were pair projects and one was a group project. Three individual projects were not graded. Four pair projects were presented to the class.

The VDL I observed was a three-day, paired, social studies presentation project. The objective was for the students to be able to identify all the famous Americans they
learned about in Kindergarten through third grade. Students worked in pairs to create a “Guess Who Project” for an assigned famous American.

Charis asked the students to research and find the full name and key information about the assigned famous American. The goal was for the students to come up with facts about these famous Americans that they learned about between Kindergarten and third grade. Charis stated her expectations for the presentation was that it would include everything that was on the SOL Blueprint. Students could include two little extra facts that they found interesting.

Charis showed students her sample Guess Who Presentation. She demonstrated the whole project step-by-step. Student had to have an Introduction slide, four fact/clue slides, anticipatory slide, and a guess-who-slide. Charis told the students to make sure their font was legible and that their picture added to the content of the slide. She also reminded them to plan and type all clues before designing pages and adding pictures.

As soon as students started working, Charis began to circulate and help students who had trouble finding pictures and writing clues. Once the project was completed, students presented them to their class. The students presented their projects like they were game show hosts. When they got to their guess-who slide they pulled a classmate’s name out of a cup and called on that child to guess the famous person. If the student guessed incorrectly they drew another name.

Charis graded the project for word content, picture and word relationship, and if the presentation included all of the required slides. Figure 4.11 shows a sample grading
sheet. This particular pair presented on the only famous American that the teacher had yet to cover. See Figure 4.11.

![Biography – Famous American PowerPoint Partner Project](image)

Anna & Taylor
Super job! You ladies did a nice job with clues for a person you didn’t even know. 😊
It made my job of teaching Cesar Chavez much easier. Your pictures made connections with the text, which is extremely important.

Grade – A+

*Figure 4.11. Sample Grading Sheet for One of the Guess-Who Presentations*

These four teachers just discussed, Carrie, Paula, Jessie, and Charis, were likely to mention basic design tips during the project introduction. However, mostly the teachers gave individual tips when they circulated during the creation of the projects. These teachers often helped students edit projects to create a concise message that synthesized ideas into a readable cohesive visual representation.

*Educational literature and the visual literacy creation process and product.*

Product Focused VDLs could be classified, in the revised Bloom’s Taxonomy, in the Create category (Anderson et al., 2001). The Create category is the highest level of
cognitive process. For a project to qualify in the cognitive process Create, it needs these three components:

Problem representation, in which the student attempts to understand the task and generate possible solutions; solution planning, in which a student examines the possibilities and devises a workable plan; and solution executions, in which a student successfully carries out the plan. (Anderson et al., 2001, p. 85)

The students’ learning went beyond the creation of the product. There were two additional educational components at work in these lessons, cooperative learning and designing a product for presentation.

Students completed each of these VDLs in a cooperative learning environment with structured student tasks. Some research indicates that cooperative learning can be more effective in increasing academic performance than individual or competitive learning (Frey et al., 2009; Marzano, 2007, Slavin, 1988; Tapscott, 2009). Marzano lists cooperative learning as one of his five macrostrategies to improve student achievement.

Students constructed a product that had a purpose, communication. Presenting added another way that students interacted with the content and promoted understanding (Marzano, 2007; Marzano et al., 2001; McKeachie, Pintrich, Lin, Smith, & Sharma, 1990). Structuring messages for communication is a separate skill, visual literacy.

It is important to note that because of my background in art education, I looked at these VDLs and saw visual literacy or the lack the visual literacy. None of teachers described their lessons with this terminology. In fact, by my simply asking questions about the VDLs, I made them more aware of how they taught this strategy. Paula told me
that since our October 2009 interview, she was looking for ways to increase visual literacy in her instruction. I believe that when possible VDLs should teach visual literacy. I believe that teachers are not aware of this literacy or its instructional importance and potential. In the following Discussion chapter, I will talk about ways I think teachers can add this instructional component.

**Teacher’s Education, Experiences, and Beliefs Influenced Their Use of VDL Opportunities**

There are a variety of reasons teachers use digital, visual, and digital visual strategies. These reasons could relate to childhood experiences, personal interests, county and colleague pressure, educational beliefs, educational and professional development background, and the ITRT who works with them. Most teachers would agree that who we are as teachers is dependent on our experiences. Teachers continue to change through our future experiences. Dewey (1966, as cited in Beattie) stated “[The] educational process is one of continual reorganizing, reconstructing, transforming experience” (p. 2).

**Childhood experiences and personal interests.**

Our autobiographies are important factors in how we teach our students. Bruner (1990) claimed that to understand people, you must first understand their experiences and how these experiences affect their life in light of their culture. Beattie (2000) argued that our personal stories, family history, and culture are central to who we are as teachers.

My pilot study that I conducted on the reasons teachers use VDLs suggested a link between the type of lessons they used and their childhood experiences. The scope of
my study was too small to confirm a link. However, research does confirm the impact of teachers’ experiences and beliefs on their pedagogy and practice (Beattie, 2000; Bergee et al., 2001; Doyle & Carter, 2003; Smith, 2001). Therefore, I asked teachers to tell me about any family member’s involvement in technology or artistic endeavors. The teachers’ first response was one of surprise as they reflected on their childhood. Paula’s response was common. “I wouldn't have thought of any of this until you started talking about [VDLs] and the [background] influences!”

Two teachers talked about fathers who were involved in technology when they were children. Caren explained, “My family has always been technology oriented. My dad …bought one of the first computers that came out, one of those ‘gi-normous’ things! … He taught me to write my own programs.” Out of the eight teachers, Caren spoke the most about the benefit of technology as a personal teaching tool. She felt that using technology saved her time, thereby allowing her to spend more time with her children.

Paula also talked about how her father influenced her technology use. Paula’s father, who was older then Caren’s father, also worked with new technology innovations. Her father trained personnel on new phone systems using schematic drawings. During the interview she remembered an interesting story that linked technology, visuals and learning. “When I first learned to drive, [my father] was teaching me how to drive a stick shift. I was not allowed to drive until I was able to draw him a diagram and label how that dumb thing worked.” Paula went on to exclaim, “Now that is really using your visuals.” Paula talked about how the combination of technology and visual learning could meet student needs. She shared the experience of teaching her own children, two gifted and
one LD. She stated that visuals added interest for her gifted children and helped her LD child process new information.

The link to familial background and personal interests and the use of visuals in the classroom was stronger than the digital one. Only Caren and Andrea said that neither they nor anyone in their family were interested in any type of artistic endeavor. It is interesting to note that these two teachers used the least visuals in their lessons. Caren was the most motivated by technology’s benefits of time. Andrea’s motivation was how digital and visual media allowed her students the opportunity of choice in evidence expression. Four teachers reported a parent who enjoyed an artistic hobby growing up. Six teachers said they enjoyed art and being involved in various artistic hobbies, from landscaping to “doing crafty things and decorating”. Several teachers reported wishing they had more time to explore this avenue.

**County and colleague pressure**

One of the more surprising things in the study was the lack of pressure teachers reported feeling from the administration of Shannon County. Most teachers reported feeling no pressure to change, and those that did stated it was a positive thing for their teaching. There was no doubt that these women had a positive attitude toward instructional technology. Buckenmeyer’s (2005) study showed that one of the strongest indicators of whether a teacher would use instructional technology was attitude. These teachers fully embraced the changes the county asked of them.

In answer to the question, “Do you feel pressured to include technology in your lessons?” Andrea stated,
I don't personally. I know some teachers do feel that way. I was willing to change, willing to learn new things, and willing to embrace technology. I wanted to learn how to use new things that are going to make my job easier in the end. Because it's going to help students understand much better. ... I think it is very important to try to keep current with technology, and current practices because learning does change and there are always ways to improve. You always want to be a learner yourself and learn new technologies and the new strategies available to help your students.

Caren answered this way, “I have to say for me it's been good. That change that has been impressed upon us has not bothered me at all. So I can't say that I have felt pressure.” She went on to say, “I do feel that some other people who are not as comfortable with technology feel pressure, but I don't!”

Paula’s response to whether she felt pressure to use instructional technology was “I want it! I want to know it all and I want to know how to use it!” Carrie simple answered the question, “No.” She was one of the eight teachers who volunteered to be on a pilot committee that brought laptops to elementary school four years ago.

Jessie came to Broadville Elementary three years ago. She was the only teacher who spoke about feeling colleague pressure. In fact, when I asked her to tell me her story about instructional technology, she started it this way:

Well honestly, initially, when I came here, I felt the pressure because I thought I am way behind where these other people are, so I really felt the pressure but it
wasn't long before I felt that it was something I wanted to do because there are so
many neat programs out there.

As Jessie’s ITRT, I was surprised that she felt pressure. She came to me for help
as soon as she arrived at the school. Jessie liked trying creative software and showed a
willingness to try any instructional tool. In my eyes, she was ahead or equal to most of
her grade level team by the end of her second year at Broadville.

Suanne stated that currently she did not feel pressure from the county.

No, I don’t feel any pressure to use technology. It is a gift. I use it like I use my
left arm. I still have other ways to teach (my right arm, to extend the metaphor)
and we need to use many ways to reach the kids.

However, Susanne’s earlier comments indicate that when she first started using
instructional technology, she felt just the opposite. At that time, Broadville Elementary
had one computer lab. This was also before the position of the ITRT in the schools.
Teachers were assigned a 45-minute time one day a week to go to the computer lab and
do a lesson. Susanne spoke negatively about this time, “It was the worst day of the week
when I had to go to the computer lab. It was horrible!” Susanne gave me three reasons for
this. She was on a learning curve, classroom management was difficult so it disrupted
learning, and there was no one to help her. Susanne went on to say that she believed that
digitals were effective in teaching students. In addition, now that the ITRT position is in
place it helps lessen her stress. Her reasons are similar to those given by Zhao and Cziko
(2001): the belief that this strategy is effective in helping to achieve instructional goals,
will not harm other instructional goals, and the resources and support are available to use these tools.

Bev, the youngest teacher in the study, expressed feeling pressured by Shannon County simply because she was provided with the tools. Bev also felt pressure from an older brother who told her she was lucky to have the instructional tools she had. This was her third year teaching and first year teaching third grade. She said,

It has made me really take advantage of [instructional technology] and use it. It's expected of me to use these things because they're there for me to use! … The first year, it was very overwhelming! As it has gone on, I feel like I really should use this because my classroom has a SMART board. I should use it every day because I should not just let it sit there. … My oldest brother is a teacher. He teaches in my hometown and he teaches high school. When I said we had SMART boards in the classroom and laptops, he is like, ‘That's so cool! You are so lucky’, so I think that has had a little bit of an influence. I really look up to him! … It has made me think, I guess, I should really take advantage of it, use it, and do what's expected of me. It's expected of me to use these things because they're there for me to use! I guess that's another reason I use it so much because I feel like it's expected of me to use it.

If we look at these teachers and the adoption of instructional technology through Rogers’ (2003) framework of diffusion of innovations, they would fit in the categories of Innovators, Early Adopters, and Early Majority. These teachers were among the first to work with the ITRT who acts as the schools’ Change Agents. Rogers’ states that the
Early Adopters are the first teachers to work with the Change Agent, and this group has the potential to influence the rest of the community through their practice. The Early Adopters are most influential in changing the practice of the Early Majority. An example of this is the colleague pressure that Jessie felt on her arrival at Broadville. Jessie stated that she felt her technology skills were inferior to her team members and she was motivated to “catch up to them”. This is what Shannon County ITRTs want to happen as they attempt to guide each school toward change. Perhaps the Broadville third grade team had reached a tipping point where change had become unstoppable (Gladwell, 2002).

**Educational beliefs, educational background and professional development**

When I talked to teachers about why they taught using VDLs, I expected them to talk about educational theory with researchers’ names. Only two teachers mentioned any research or researchers by name. Andrea, who just finished her Master’s work, talked about Multiple Intelligences. Susanne talked about working at the top of Bloom’s Taxonomy. These findings support the idea that teachers are practitioners and are more concerned about what works and what does not in their classroom then with the theory behind it. Killon’s book on professional development, *Becoming a Learning School* (2009), noted this trend and suggested that the most effective strategies for changing teacher’s pedagogical belief and enhancing student learning is through embedded professional growth. In Shannon County, the ITRT works in this role. This finding will be discussed in light of implications for Professional Development in the Discussion chapter.
I did not design this study to look at the ITRT’s effect on the schools. However, I believed that the teachers’ different ways of using VDLs are in part related to the school’s ITRT. The study looked at high VDL using teachers from two schools that were similar in student size and social economical make-up. Each school had the same ITRT for the past five years. I work at Broadville Elementary and Lynn (pseudonym) at Starwood Elementary. She and I have similar backgrounds in professional development and number of years of teaching experience. At the beginning of the study, I believed that this would limit the factors that were involved in how the teachers used VDLs. Instead, what it did was allow me to compare the two schools and see a common pattern in how they taught VDL.

The influence of the ITRT on the teachers was evident in their comments. Only Carrie did not list the ITRT as a major influence in how she taught instructional technology. All eight teachers talked about working with their ITRTs to help design lessons. Andrea was the only one who did not talk to the ITRT about the activity I observed.

Another influence for how teachers used the VDLs is the instructional focus of the schools. Starwood required all classroom teachers to attend a Word Study in-service last summer. This in-service encouraged the use of visuals to help students process information. Broadville did not mandate any in-services the last few years. However, its principal strongly supports project-based learning opportunities.
A major focus is the county’s focus on 21st century skills as defined in the *Learning for 21st Century Skills* (2002). The whole IRTT program is in place to encourage teachers to embrace instructional technology and 21st century learning.

**Summary.**

Teachers shared a variety of reasons why they used digitals, visuals, and VDLs. Reasons for using digital technology ranged from its benefit as a teaching tool to its meeting the needs of students’ learning styles. Teachers listed the reasons to use visuals in the classroom as individualized instruction for various learning styles, students learn better by seeing, and improved student retention and understanding. The teachers agreed that use of visuals and digitals increased the motivational and learning power of lessons.

Teachers used VDLs in two ways, Process Focused and Product Focused lessons. For teachers who designed Process Focused activities, the lesson’s objective was to create a learning experience where students interacted with the content by elaborating and/or interpreting it to a graphic. Teachers assessed these graphics as evidence of knowledge.

Most Product Focused lessons were multiple-day culminating projects that taught some elements of visual literacy. Students often used the product to extend their learning by using it to present to their classmates. Teachers also assessed these projects as evidence of knowledge. The assessments of these projects could be individual, group, or both.

A teacher’s willingness to use digitals, visuals, and digital visuals in their lessons may be linked to their childhood experiences. The number of participants in my study is
too small to confirm such a link. However, previous research studies suggest the
possibility of this link (Beattie, 2000; Bergee et al., 2001; Doyle & Carter, 2003; Smith,
2001).

Only two teachers listed research and researchers as the reasons for why they used
VDLs. The others shared their beliefs about what worked and what did not without
referencing any researcher. Killon (2009) stated this trend as common among teachers.

The teachers in the study did not list pressure to use instructional technology from
Shannon County as a negative factor. Instead, they either did not feel pressure or stated it
was a positive influence. These teachers were among the first people to use instructional
technology in their schools. They believed in the benefit of these strategies. This belief is
one of the greatest indicators of teachers who will use technologies (Buckenmeyer, 2005;
Schacter, & Fagnano, 1999).
Chapter 5. Discussion

This chapter discusses the results of this study and the findings from the data presented in Chapter 4. Through answering the research questions, I wanted to gain a better understanding of why and how high-VDL-using elementary teachers used this strategy as a tool to facilitate student learning. I also wanted to discover if teachers’ education, experiences, and beliefs influenced their use of VDLs. These teachers’ reasons, ways, and the influences for using VDLs will be discussed through the six findings in the study. I satisfied both my intellectual and professional goals for this study. I will design a professional development course based on the results of the study. I hope to promote increased use of this strategy in Shannon County’s schools.

Three research questions that guided this research.

1. What are the reasons these high-VDL-using elementary teachers use this strategy?
   a. How do these teachers’ reasons relate to their views of learning?
   b. How do these teachers conceptualize the advantages and limitations of VDLs?

2. How do the teachers actually use VDLs in their classroom?

3. How have the teachers’ education, experiences, and beliefs influenced their use of VDLs?
The discussion of the study follows the main themes that emerged from the analysis of the data in the process of answering the research questions. Six findings emerged from this study, and they are:

1. The teachers held common views of learning.
2. Teachers’ use of VDLs reflected their ITRT’s personal pedagogy.
3. Teachers shared common reasons for using VDLs.
4. The digital part of the VDLs had both advantages and limitations for the teachers.
5. Teachers’ experiences, both childhood and classroom, influenced practice.
6. Teachers who used Product Focused lessons were more likely to teach visual literacy.

**Finding 1 - Common Shared Views of Learning and VDL**

The findings of this study revealed six common shared views of learning. These views were:

- Learners need to actively construct knowledge,
- Learners achieve understanding and retain knowledge through visually interpreting and/or elaborating on content information,
- Teachers should accommodate VAK learning styles,
- Learning needs to be concrete and visual materials help with this,
- Learners need to connect new knowledge with prior knowledge, and
- Learning should be fun.
All six of the above views of learning were embedded themes in the county’s professional development classes. All eight teachers provided evidence of their beliefs through their interviews and observations. Shannon County’s professional development programs encourage the use of visuals for the above reasons. However, even though teachers designed VDLs with these common views in mind, there were two ways the teachers used the lessons. I have labeled these Process Focused lessons and Product Focused lessons.

Process Focused lessons allow students to process content knowledge visually through interpreting and/or elaborating. This type of lesson was usually completed in a class period. The outcome of these lessons usually had two purposes. First, visuals provided a graphic structure to help students process and understand content knowledge. Secondly, they provide teachers with evidence of the understanding of the concept. The lessons’ outcomes were not to provide a cohesive message project. While teachers may have hung these activities in the hall, students did not use them for presentations.

Product Focused lessons allow students to research, plan, and organize their thinking by creating a cohesive message visual product. This type of lesson was often a collaborative and culminating unit activity that took place over several days. Teachers who used Product Focused lessons frequently provide their students opportunities to share their creations with classmates and/or others.

Process Focused and Product Focused lessons fall differently in the revised model of Bloom’s Taxonomy (Anderson et al., 2001). Process Focused lessons often fall in the Understand and Apply categories, whereas Product Focused products usually fall into the
Create category. These lessons are usually culminating and multi-day projects. Students use content knowledge from multiple resources to create a new original product.

Teachers who were in the Product Focused group were more likely to include visual literacy tips than the Process Focused group. This appeared to be because this group saw the students' learning continuing past product creation and into the presentation. Since students used their products to present to or teach their peers, students needed to make sure their visual message was clear.

**Finding 2 – VDLs Reflect ITRT personal pedagogy**

In both schools, the teachers’ use of VDLs reflected their ITRT’s personal pedagogy. At Starwood, three teachers showed a preference for the use of Process Focused lessons. Starwood’s ITRT was one of the county’s main Marzano trainers and former math educator. Marzano believes that students benefit when they elaborate on content knowledge and express it through non-linguistic representations. While at Broadville, three teachers spent more time on Product Focused lessons and were more likely to teach visual literacy. I was Broadville’s ITRT, and the county’s main visual literacy trainer and a former art educator.

Influence of the ITRT on more than a teacher’s digital practice was at first surprising. However, all of these teachers reported working with the ITRT closely to create the lessons. It makes sense that when you collaborate with someone, the lesson reflects the values of the lesson designers. All but one of the observed lessons were discussed with the ITRT before the actual instruction took place.
Finding 3 – Teachers Shared Three Common Reasons

The study research showed teachers shared three common reasons for VDL use:

- VDLs increase students’ understanding and improve retention of content.
- VDLs engage and motivate students.
- VDLs meet students’ needs through a media that is sensitive to nonverbal learning styles.

**VDLs engage and motivate students.**

The study found that Broadville and Starwood participating teachers also believed that the digital component of VDLs contributed to the students’ learning process by adding motivation, immediate feedback, and multi-sensory learning opportunities. These findings match a study done by Pitler et al (2007). Several of these teachers talked about the motivational advantages of using technology to improve student behavior. One teacher talked about how she reminded students that they must use it ‘right’ or lose the privilege to use technology.

**VDLs increase students’ understanding, improve retention of content.**

The study found that all teachers believed that the use of VDLs improved students’ understanding and retention. Several teachers discussed feeling that student test results were higher after VDLs. Existing research supports the teachers’ common belief that engaging their students in the creation of symbolic information representation improves content retention. Marzano’s 1998 meta-analysis showed that nonlinguistic representation enhances students’ ability to remember and understand knowledge.
The most used nonlinguistic representation strategy was a type of visual mnemonic where students used words and images to construct symbolic representation of knowledge.

Paivio’s (1991) dual-coding cognitive processing theory proposed that knowledge is stored in two ways, linguistic and nonlinguistic. Marzano et al., (2001) defines the nonlinguistic mode as any form of expression other than language, this includes mental pictures, physical sensations, such as “smell, taste, touch, kinesthetic association, and sound” (p. 73). Dual-coding theory encourages teachers to use a multi-methods mode of instruction to help students process and retain knowledge better.

Existing research also supports the teachers’ use of visuals to allow students to actively interpret and/or elaborate on content knowledge (Anderson et al., 2001; Pressley, Symons, McDaniel, Snyder, & Turnure, 1988; Woloshyn, Willoughby, Wood, & Pressley, 1990).

Graphic organizers are one of the most common visual tools that teachers use to allow students to interpret content knowledge. Many studies have shown the benefits of graphic organizers. Some of these studies were done by Boulineau, Fore, and Hagan-Burke and Burke (2004), Ives (2007), Lovitt and Horton (1994), McCoy and Ketterlin-Geller (2004) and Williams et al., (as cited in Flores, 2008). These researchers state that this tool helps students recognize relationships between ideas and concepts. Furthermore, “visual depictions of information and relationships also may be helpful for memory or retention by providing students with an avenue for picturing information in their mind” (Flores, 2008, p. 225).
Product Focused lesson and Process Focused lesson outcomes can be looked at through the revised Bloom’s Taxonomy (Anderson et al., 2001). This theory provides a cognitive framework to analyze the relationship between typical Process Focused lessons and typical Product Focused lessons. Process Focused VDLs usually fall into the Understand category. Process Focused VDLs often promote knowledge retention by providing students activities where they interpret information, usually words, into graphics. This act of interpreting information promotes knowledge transfer that helps students build connections between new knowledge and prior knowledge (Anderson et al., 2001). Product Focused lessons allowed students to research, plan, and organize their thinking by creating a unique new visual product.

**VDLs meet students’ needs through learning styles.**

All of the teachers talked about using VDLs to accommodate visual and/or kinesthetic learners. Existing educational research into learning styles is vast and at times contradictory. Sharpa et al. (2008), in their review of learning style research and literacy, state that this theory can be traced back over 100 years with increasing proliferation starting in 1960. He goes on to say that there are about as many variations of this theory as researchers themselves. The first problem with learning styles is that there are multiple definitions (Cassidy, 2004). For this study, I used De Bello’s (1990) definition. He states, “Learning style is the way people absorb, process, and retain information”.

As I previously mentioned in the literature review, a second problem is the reliability of the self-ascribed inventories survey tool used to identify learning style theory (Geake 2008; Sharpa et al., 2008; Sparks, 2006; Stahl, 1999). Finally, learning
styles as a scientific theory has experienced many critiques and there is little empirical
evidence that matching students to their preferred learning style results in increased
academic achievement (Curry 1990; Sharpa et al., 2008).

Regardless of the weak empirical evidence for the scientific theory behind
learning styles theory, the fact is it has influenced Shannon County Schools’ teachers. Its
message to diversify instruction to meet the students’ needs was a central component in
the teachers’ values I studied.

This research highlights the fact that as humans we all process information
through these various sensory modes. During the course of our day, we are required to
represent our knowledge in many diverse ways, so students’ learning experiences should
reflect this reality. Students need to understand how to express themselves both verbally
and visually. This type of instruction, includes multiple modes of teaching and provides
opportunities for students to share evidence through multiple modes, and makes the
practice of labeling students by learning styles a moot point.

Finding 4 - The Digital Tool and VDLs

The digital part of the VDL was both an advantage and a limitation for the
teachers. Six of the eight teachers believed that the use of digital lessons saved them time.
They cited personal convenience of grading projects and the ease with which they could
create and store instructional materials. Lee and Cerreto’s (2009) study of 397 secondary
teachers in South Korea also listed time saving as an advantage of using technology tools.
However, using technology tools can be a risky instructional decision. Teachers feared
the potential instructional time lost if a technology tool failed. One teacher also talked
about the classroom management issues that arise when technology fails. She explained the frustration she felt trying to scramble to fix the equipment and salvage a lesson. Another teacher talked about losing additional time because she always needed to plan a Plan B just in case. All teachers agreed that technology failure was a huge concern.

Buckenmeyer and Freitas (2005), Vannatta and Fordham (2004), and Zhao and Cziko (2001) found that one predictor of a teacher’s willingness to adopt technology techniques into their instructional practices was the assurance of technical support in the eventuality of technology failure.

Finding 5 – Teachers’ Experiences Influence VDL Practice

Teachers’ childhood experiences.

Existing research into teachers’ pedagogical practices tied them to all of their experiences, childhood, and educational (Beattie, 2000; Coia & Taylor, 2001; Knowles, 1994; Rossiter, 2002; Santoli, 2009; Smith, 2001). Teachers, like all human beings, are a sum of their parts. This influence can be seen in the reasons why they became teachers, how they problem solve, and their ideas of what students should and should not do. Beattie (2000) states, “Teacher education is an holistic enterprise involving the whole person” (p. 2).

My study showed that visual media had a stronger link to family background and/or personal interest than digital media. The six teachers who used the most visuals in their teaching said that they had a parent who was involved in the arts or were themselves involved in an artistic hobby. However, I believe that the appearance of a stronger link to
art than to technology can be explained by the newness of the personal computer. Six of the teachers were in their mid 30s to mid 50s so for them to have experiences with technologies in their childhood meant that their parents were among the earliest adopters of technology.

**Teachers’ attitude/perception.**

Buckenmeyer and Freitas’s (2005) and Vanatta and Fordham’s (2004) research showed that “attitude toward technology was found to be the strongest predictor of teacher technology adoption and use, while having available resources and support was the most powerful” (Buckenmeyer & Freitas, 2005, p. 14). However, Zhao and Cziko’s (2001) and Bednar and Sweeder’s (2005) research stated that a teachers’ perception of the potential benefit of technology is the biggest factor in their eventual use. Their research showed teachers must believe that the technology strategy will not cause harm to other instructional goals, and the resources and support are available to use these tools.

Research listed both attitude and perception as indicators of a teacher’s willingness to adopt technology. I believe that attitude and perception are different sides of the same coin. If you perceive something to be worthwhile, you have a better attitude towards it. Likewise, if you are open-minded about change, your attitude may allow you to see the benefit of different technology faster than someone who is more close-minded to change.

Surprisingly, none of teachers perceived the county’s pressure to integrate technology into their classroom practices as a negative thing. These eight teachers were among the first teachers in their schools to integrate technology, showing that they had a
good attitude about change. Likewise, they saw the potential for the technology to benefit their students and/or themselves. The question I asked myself was “Why?” For two teachers, the reason seemed to be linked to their childhood experiences. These teachers listed fathers who encouraged them to use technology through their example. Another teacher believed that one of the reasons she used technology was because she was “lucky enough to have it in her classroom” and her brother did not. Most of the teachers stated that they were personally interested in technology, and in addition, they want to use it in the classroom.

The research of Buckenmeyer and Freitas (2005) and Bednar & Sweeder (2005) showed that adequate supplies of technology resources were a big factor in why teachers used technology. The research of Zhao and Cziko (2001) also showed that while adequate resources were a predictor, a teachers’ perception of the potential benefits of technology was still more powerful. They found that teachers overcame the lack of equipment through grants and personal resources. They believed that a teacher’s lack of skill could be augmented by using students, peers, and technology resources people.

To my surprise, my study supported the findings of Zhao and Cziko (2001) in regards to the equipment resources. I found that the schools’ unique distribution plans seemed to have little influence on how teachers designed VDLs for individual or pair/group projects. Broadville teachers used pair/group VDL projects 7% more often than Starwood teachers did. This was true even though Starwood assigned one-laptop cart of 12 or 13 laptops to share between teachers. This plan meant that if teachers wanted students to use laptops at the same time, they must share. Although all Starwood teachers
reported using pair/share lessons, the majority of their lessons were completed individually. For individual lessons, teachers either went to the desktop lab where there was a computer for every student, or the students took turns on the laptops. See Table 4.3. The teachers’ perceived value of a lesson motivated teachers to find ways to teach what they felt would be most beneficial to their students. Another example that supports Zhao and Cziko (2001) is that several of these teachers shared how they made purchases on their own to supplement their technology resources. In fact, a personal example was my husband purchased his own classroom projector for $800.00 before it became standard issue in Shannon County.

**Teachers’ success.**

Six of my study’s teachers began working with their ITRT five years ago when Shannon County first launched the program. Perhaps this explains why they were the highest VDL users in their schools. Research into teacher efficacy confirms that a teacher’s positive past experiences influence their willingness to continue a practice (Bandura, 1997). The teacher’s successful history of VDLs with students encourages them to continue to use these lessons and to add to the repertoire of lessons. Guskey’s (1986) study on teacher technology listed the importance of a teacher seeing the evidence of a successful new strategy to cement new changes in practices.

**Finding 6 - The VDL and Visual Literacy**

Only teachers in the Product Focused group taught any type of visual literacy. These teachers used design tips such as using the correct font size, judging a font for
readability, and clarity of message concerning all design elements. Teachers taught visual literacy skills usually when the product was to be used as the students’ communication tool for a presentation. Teaching visual literacy in the context of preparing students to create a presentation product is an authentic and useful educational experience.

“The primary literacy of the 21st century will be visual: pictures, graphics, images of every kind” (Burmark, 2002, p. 1). Visual literacy skills deal with the ability to use images to communicate ideas and information. Visual literacy is also a person’s ability to decipher and interpret visual messages (Partnership for 21st Century Skills, 2001). Visual literacy skills are not innate. This literacy, like any other literacy, is learned through instruction (Burmark, 2002). Visual literacy fits into the creation of a project for a Product Focused lesson. However, the finding of this study, and my experience in art and instructional education, shows that even teachers teaching visual literacy in Product lessons were not fully aware or comfortable with the content to cover these skills.

Teachers in the Process Focused group did not teach visual literacy, nor did they need to if their objective was helping students process information. In lessons where students are finding and organizing information, elaborating on content, and making their thinking visible, there would be no need to create a product with unifying graphics and fonts to communicate a message. Both types of VDL have essential educational roles in helping students learn.

**Implications of the study**

The finding in the study that these two schools’ ITRTs personal pedagogy was mirrored in three of the four participants, holds specific implications for my VDL
professional development goal. My goal is to create a professional development course for the teachers based on the findings of the study. The above implication that the ITRTs influenced not only teachers’ digital practices but also their pedagogy, needs to be weighed carefully by myself and my ITRT peers.

This study showed that the ITRT’s pedagogy affected instructional decisions which in turn affects instructional time. In the 2009-2010 school year, the Broadville study teachers reported spending an average of 21 hours on VDLs. This compares to the Starwood study teachers report time of a little less than 13 hours per teacher. Both schools completed exactly 29 lessons. Therefore, the difference in the amount of time seems to be linked to Broadville’s use of Product Focused lessons.

In the study, the average Product Focused lesson took almost five hours to complete compared to the average one-hour Process Focused lesson. This large additional time commitment on the part of the teacher with limited time resources suggests and reflects their belief in the potential instructional benefit to their students. Two of the Broadville teachers shared their concern that while doing a Product Focused lesson they may be taking time from other instructional areas. However, the fact remains that even with limited instructional time, Broadville teachers spent seven hours longer instructing using VDLs compared to Starwood teachers.

Previously discussed research (Bednar & Sweeder, 2005; Zhao & Cziko, 2001) showed that teachers will only adopt a strategy that they perceived to be of greater educational benefit for them. So what caused them to be willing to commit the time to this type of VDL lesson? The findings of this study showed that ITRTs have influence on
the type of digital lessons a teacher uses. I believe that my background in the arts and my recommending Product Focused lessons before other forms of digital instruction influenced the Broadville teachers. I believe that through my modeling of Product Focused lessons over the last five years with these teachers, I had an impact on their perception just like the Starwood ITRT influenced her teachers.

**Implications for self reflection.**

As the embedded coach at Broadville, the personal implications of this study is to evaluate the influence I had on the teachers and how it impacted their students learning. I am asking myself, did my preference for this type of lessons cause me to overlook the educational value in a Process Focused lessons? Was the educational value worth the cost of four additional hours per lesson? The research on Process Focused lessons clearly shows that students improve their understanding and retention of knowledge through using this strategy.

The power of the Product Focused lesson is that it extends the learning beyond the process of creation. Students receive both the advantages of visual cognitive thinking in the Process Lesson and the benefit of synthesizing information into a cohesive communication piece. This type of project provides the opportunity for embedded authentic visual literacy instruction. Should this type of VDL be done all the time? I believe that answer is no. Teachers need to understand the potential of both types of VDLs.

An informal discussion with Shannon County’s ITRTs who serve the other 15 elementary schools showed that most of them do not actively promote Product Focused
lessons. This is significant because the findings of this study showed that Process Focus lessons rarely included visual literacy. This probably means visual literacy is rarely taught at these schools. NETS’s Performance Indicators for Students standard (2007) states: “Students will communicate information and ideas effectively to multiple audiences using a variety of media and formats” (p. 1). NCEL & Metiri Group. (2003) advises, “Students need good visualization skills to be able to decipher, interpret, detect patterns, and communicate using imagery” (p. 18). Our county’s mission statement states that schools are “Preparing all students to excel in a dynamic global society.” I believe part of excelling in a global society means students should be able to read and use visuals in this increasingly digital visual world. Even teachers who used visual literacy tips in their Product Focused lessons did not talk about this as a skill or consider it a literacy.

**ITRTs and professional development.**

One purpose of the study was to provide insight into the design of professional development courses to encourage teachers to increase their VDL use and awareness of visual literacy. The implication of the study is that a professional learning opportunity needs to first focus on the ITRTs. Just as the research on teachers indicates that childhood influences our teaching, we are a sum of our experiences. As ITRTs, the skills and pedagogical beliefs of our classroom teaching experiences are passed on to those we serve. Not only do the ITRTs need to share their experiences with each other, they need to reflect on all of the ways they influence teachers’ instructional practices. Since my expertise is art education and visual communication, I have a responsibility to share those skills with my colleagues as well as learn from their expertise.
In my role as the county’s visual literacy speaker, I need to present a balanced approach to VDLs. I need to show how Process Focused lessons can improve students’ understanding and retention for discrete skills in a quick efficient manner. However, my professional experiences and this study confirmed that most teachers are not aware of visual literacy. I plan to alter my presentation to include types of Process Focused lessons, as well as, Product Focused lessons and the rational for including visual literacy in lessons where students’ projects are effective tools for communication. I believe that teachers need to understand how both VDLs can positively affect the learner.

Furthermore, research into the most effective professional learning experiences for teachers shows that one-day sessions do not change practices. Teachers need to be actively engaged in professional development courses. This involves allowing teachers to try lessons in their own classrooms and evaluate their own student outcomes (Clarke & Hollingsworth, 2002; Reeves, 2010). In light of the existing professional development research, I have planned a 20-hour visual literacy professional development course that will begin in January 2011.

This course will include nine two-hour face-to-face sessions followed by project activities for the teachers to try in their classrooms. The last session will include time for teachers to share how their VDL lesson went. Time will be set aside for feedback from other teachers on the lessons they shared.
Limitations of study

**Generalizability.**

This study was local and based on the unique circumstances of Shannon County’s ITRT program and their technology tools. Furthermore, the size, eight participants in the study, makes this study one of personal and local significance. I do not attempt to generalize the findings beyond my county. However, I believe that this study could inform other school districts with similar embedded coaching programs and technology tools in the practices of teachers concerning VDL and the influences of coaching programs. It certainly highlights the influence a coach may have on a teachers’ practice.

I also believe that VDLs are an essential digital instructional tool. Both types of visual lessons can be used to improve student understanding and retention. However, because of students’ access to mass media, visual literacy is something each teacher should consider using when planning their lesson objectives.

**Validity.**

The ITRTs’ influence on the participants presented was a big feature of the study. My background in education caused me originally to frame the study as one that would look only at visual literacy in the elementary classroom. My initial belief was any VDL that did not include visual literacy was deficient. It was only after I started to observe and analyze the VDLs, especially at Starwood, that I started to question this approach. When I evaluated the observation lessons, in light of the teachers’ objectives and time available, I began to realize that both types of VDLs were educationally valuable.
At Broadville, my role as researcher was different than that of my role as their ITRT. As Broadville’s ITRT, these teachers came to me for advice and technology support. The line between researcher and teacher was most clearly defined in the interview when I was learning from them. During the observation for both teachers and the students, my role in their classroom was commonplace and presented no distractions. In fact, I was often asked for technology support just like in my normal role. Because the teachers were familiar with me, I believe that my researcher role was less influential to these teachers than my five year role as an ITRT.

However, at Starwood my role as a researcher did have influence. Paula told me at the end of the study that our interview in October made her more cognizant of the role visuals could play in education. Paula, in the year of the study, spent one hour more on Product Focused lessons. I believe the influence here really relates back to how these teachers so often talked about trying to meet the needs of each learner. They were open for tools that might be able to help their students. Paula also had a family history of technology in her family as well as one rich in the arts. This background in the arts probably made her more aware of the visual learning potential than a teacher who did not have this background.

Recommendations for further research

This study showed that teachers who used Product Focused lessons spent an average of four hours teaching the lesson, while the average Process Focus lesson took one hour. Since time is such a limited resource in education, I believe a future qualitative research study that looks specifically at why teachers were willing to invest this amount
of time in Product Focused lessons would be beneficial. What do teachers perceive to be the educational payoff for time invested in this strategy? This type of research would call for a careful study into the teachers’ different types of learning goals and the lesson outcomes. Understanding teacher perceptions would be helpful in designing future professional learning opportunities that promote Product Focused lessons.

Additional future qualitative research similar to the scope of this study but within another district would be beneficial to see if the results of this localized study are similar to other schools’ populations. In addition, a follow-up study using quantitative and statistical methodologies should be undertaken to determine to what degree the findings of this study reflect the larger group.
References
References


Burmark, L. (2002). *Visual literacy, learn to see, see to learn*. Alexandra, VA: ASCD.


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Appendix A

Dear Teacher,

You are receiving this letter because your Instructional Technology Resource Teacher has identified you as someone who regularly uses technology with visual learning as part of your instructional practice. (Basically anytime you use student generated graphics and/or symbols as part of your instruction). I am conducting a study that looks at how and why teachers use this strategy. It is my hope that by better understanding this, I will be able to design professional development opportunities to encourage more Shannon County teachers to use similar techniques.

I am a teacher with 24 years teaching experience currently working as an Instructional Technology Resource Teacher. I am a part-time student at George Mason University. This study is the research for my dissertation. Enclosed you will find an abstract of my proposed doctoral study.

Participant teachers will be asked to complete the following:

- Initial one-hour audio tape interview,
- Observation of a class lesson that uses visual literacy,
- Follow up interview to discuss the lesson, and
- Artifacts collected would include a copy of the teacher’s lesson plan and evaluation form if used.

If you are interested in participating in the study please email me at knegley@es.scs.k12.va.us and I will set up time to come and discuss the study with you.

Thank you in advance for your consideration.

Sincerely,

Katrina
Appendix B
ABSTRACT

The purpose of my proposed research is to understand why and how elementary teachers use visual literacy, VDL, in their classrooms. Most existing literature in visual digital education focuses on teachers delivering the content through the visual art curriculum. Two dissertation studies, Lin’s (2008) study on high school art teachers and McDougall’s (2004) on elementary teachers teaching visual literacy through the art curriculum, indicated that teachers were not aware of visual literacy language. These teachers viewed visual literacy as a collective skill set that described what students should learn in a technology rich society. In my study, I want to focus on elementary teachers and why and how they use this strategy in the non-art curricula. I believe that these teachers, like the ones on the previous studies, may not be aware of the visual digital language but feel it is important to include it in their instruction. What I want to learn is why and how they choose to do this.

I will include 6-8 teachers who use visual literacy in their instruction. The specific research questions that guide my research are:

1. What are the reasons why high-VDL-using elementary teachers use VDL?
   a. How do these relate to her views of learning?
   b. How does she conceptualize the advantages and limitations of VDL?
2. How does the teacher actually use VDL in her classroom?
3. How has the teacher’s education, experiences, and beliefs influenced her use of VDL opportunities?
My research focuses on the individual teacher’s conceptualization and use of VDL opportunities and explores how the teacher’s experiences, beliefs, and education influenced these practices. The goal of this study is to contribute to understanding how and why teachers use VDL strategies with the future goal of designing professional development to encourage more widespread use.

I will conduct one-hour audiotape interviews with each teacher. I will also observe a class lesson that uses visual literacy. I will take field notes during the observation on the classroom setting, lesson content and design, purpose of lesson, and evaluation, if any, of the project. I will schedule a follow-up interview to discuss the lesson with the teacher. Initially I will code the transcripts and observation memos into interesting and informative data segments. I will sort data segments into categories and then themes. However, I feel it will be important to preserve each teacher’s context when comparing the connections between thinking, influences, and use of VDL. I will use a strategy that integrates categorizing and connecting strategies (Maxwell & Miller, 2008). I believe that by understanding the reasons why and how these teachers use this strategy, I will be able to encourage the use of visual literacy as a strategy.
Appendix C
Interview Guide for Initial Interview

Since my study is of a qualitative nature, additional questions may be asked to follow up on the answers that are given. The first interview will focus on how the teacher became a high visual literacy user in the elementary classroom.

1. Please tell me your story, or the process, about how you began to use visuals and technology with your students. What led you to this process?

2. How did you see yourself develop and change in your use of this strategy?

3. Who, if anyone, influenced your use of this type of instruction? Tell me about how he/she influenced you.

4. How do you feel this has affected your teaching style?

5. How have your views of teaching changed since you started to use this strategy?

6. What affect has this had on the students in your classroom? Do you see any difference in the learning environment when using this strategy?

7. Tell me about your favorite lesson where students used technology to create a visual learning experience.

8. What positive changes, if any, have occurred in your classroom since using visual digital projects?

9. What negative changes, if any, have occurred in your classroom since using visual digital projects?

10. What do you think is the most important benefit for you and your students from using this type of learning?

11. What do you think is the biggest drawback for you and your students from using this type of learning?

12. What advice would you give to a teacher who wants to have her students use more (or more effective) visuals when using technology?

13. Is there anything else you would like to share on this topic?

14. Is there anything else you would like to ask me?
Follow-up Interview Guide

The follow-up interview questions will focus on instructional techniques observed during the lesson and serve as a member check tool to help establish the emic concepts of the participating teachers. The majority of these questions will be based on the observation and initial interviews. Here is a sampling of possible questions:

1. Please tell me about the lesson I observed.

2. How did you design the lesson?

3. What were your goals for the lesson? How did, or did not, the lesson accomplish these goals?

4. How is this typical or atypical of the lessons you teach when you are not using this strategy?

5. How is this typical or atypical of other lessons’ visual and technology strategy that you used in the past?

6. If you are planning to evaluate the lesson, what criteria will you use?

7. Can you tell me why you would, or would not, use this lesson in the future?

8. In your opinion, what do you feel your students felt about the lesson?
Appendix D
Informed Consent Form

Understanding Classroom Teachers Conceptualization and Use of Visual Digital Design

RESEARCH PROCEDURES
This research is being conducted to understand how classroom teachers conceptualize and use visual digital learning in their classrooms. If you agree to participate, I will ask you to be part of the following:

1. A one-hour interview scheduled to take place during the early fall in your classroom.
2. Allow me to observe a lesson that incorporates visual digital learning. I will schedule the observation at your convenience.
3. An approximately 30 minute follow-up interview scheduled to take place in your classroom to discuss the observation.

The total estimated time for each participant would be approximately 1 ½ hours for both interviews. Both interviews will be audio taped.

RISKS
There are no foreseeable physical, psychological or legal risks to you for participating in the study.

BENEFITS
There are no benefits to you as a participant other than to further use visual digital learning opportunities.

CONFIDENTIALITY
The data in this study will be confidential. Your name will not be included in any of the reports or publications arising from this study. Instead, a code name will be placed on the collected data backed, through the use of identification key, will allow me as the researcher to link your interviews and observations to your identity. Only I, as the researcher and those George Mason University personnel tasked with oversight of this research project will have direct access to the identification key. Those personnel are:

Ms. Katrina Negley, George Mason University doctoral student conducting research project.
Dr. Joseph Maxwell, George Mason University, dissertation committee chairperson
Dr. Kimberly Sheridan, George Mason University, dissertation committee member
Dr. Earle Reybold, George Mason University, dissertation committee member

PARTICIPATION
Your participation is voluntary, and you may withdraw from the study at any time and for any reason. If you decide not to participate or if you withdraw from the study, there is no penalty or loss of benefits to which you are otherwise entitled. There are no costs to you or any other party.

CONTACT
This research is being conducted Katrina Negley at George Mason University as her dissertation study. She may be reached at 540-972 -0120 for questions or to report a research-related problem. Dr. Joseph Maxwell is Ms. Negley’s advisor and can be reached at jmaxwell@gmu.edu. You may contact the George Mason
University Office of Research Subject Protections at 703-993-4121 if you have questions or comments regarding your rights as a participant in the research.

This research has been reviewed according to George Mason University procedures governing your participation in this research.

CONSENT
I have read this form and agree to participate in this study.

__________________________________ I agree to have my interviews audio taped.

Participant Signature
__________________________________ I do not agree to have my interviews audio taped.

Participant Signature

Name

Date of Signature

Version date:

# Appendix E

## Matrix Guide for Observation Recording and Summarizing Observation

<table>
<thead>
<tr>
<th>Data - What</th>
<th>Description</th>
<th>Research Question Importance – So What?</th>
<th>Documentation – What is the Evidence?</th>
<th>Member Check Needed</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Setting</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Classroom Setting for lesson</td>
<td>Computer lab or classroom - speaks to how integrated the VDL project is within the learning unit</td>
<td>(2) Is project integrate into lesson? If so, it is most likely a COW with laptops will be used over weekly scheduled computer lab</td>
<td>Computer schedule for week Observation</td>
<td>X</td>
</tr>
<tr>
<td>Examples of VDL displayed in room</td>
<td>Visual poster provide students with tips on good design - emphasis maybe on final product</td>
<td>(1) (2) Project used for publishing or student sharing back may indicate teachers’ belief of the VDL end product value</td>
<td>Field notes</td>
<td>(2) need X</td>
</tr>
<tr>
<td>Design of learning environment</td>
<td>Individual or Group student work station - space &amp; configuration</td>
<td>(1) (2) Group or Individual work (2) Indicates teachers’ belief in ongoing or summation of VDL learning projects (3.) Indicates possible link – importance of group work</td>
<td>map of student work stations</td>
<td>(3.) needs x</td>
</tr>
<tr>
<td>Rules for student behavior during VDL project (class management)</td>
<td>Do students collaborate when working? Are other resources used?</td>
<td>(1) Evidence of how (2) Evidence of teachers’ beliefs on VDL as a learning strategy (3.) Evidence possible link – importance of group work</td>
<td>Field notes Possible handouts if used for students</td>
<td>(2) &amp; (3.) x</td>
</tr>
<tr>
<td>Time frame for lesson</td>
<td>Period of time for actual VDL</td>
<td>(1) Process or end produce (2) Evidence of how</td>
<td>Plan book – lab or COW schedule</td>
<td>(2) needs X</td>
</tr>
<tr>
<td>Time frame for entire unit</td>
<td>Period of time for actual VDL compared to whole unit</td>
<td>(2) Evidence of how – integrated or end (3.) time clue to teacher’s value of VDL</td>
<td>Plan book</td>
<td>(2) needs X</td>
</tr>
<tr>
<td>Data - What</td>
<td>Description How, Where, &amp; When</td>
<td>Research Question Importance – So What?</td>
<td>Documentation – What is the Evidence?</td>
<td>Member Check n Needed</td>
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<tr>
<td><strong>Teaching Event</strong></td>
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<tr>
<td>Key Teaching Moments for VDL</td>
<td>Is the VDL project woven throughout lesson? When does VDL project occur in the lesson</td>
<td>(1) Evidence of how (2) Evidence of conceptualization – what is important (3.) Evidence possible link –</td>
<td>Field notes</td>
<td>(2) &amp; (3.) x</td>
</tr>
<tr>
<td>Teaching Design tips</td>
<td>Are design tips given at any time within the lesson? If so, how and when?</td>
<td>(1) Evidence of how (2) Evidence of conceptualization – what is important (3.) Evidence possible link</td>
<td>Check list of tips</td>
<td>(2) &amp; (3.) x</td>
</tr>
<tr>
<td>Key Teaching Digital Moment</td>
<td>What directions are given for students to use digital media? Is it scaffold? Is it a new media for students?</td>
<td>(1) Evidence of how (2) Evidence of conceptualization – what is important (3.) Evidence possible link</td>
<td>Field notes Teacher handout if any are used</td>
<td>(2) &amp; (3.) x</td>
</tr>
<tr>
<td>Procedures for lesson – Student-on-task</td>
<td>What procedure are put in place for the following: • Students who need help • Differentiate student learning • Classroom management • Are student used as a resource for peers?</td>
<td>(1) Evidence of how (2) Evidence of conceptualization – what is important (3.) Evidence possible link</td>
<td>Field notes on procedure Teacher’s handout if any are used</td>
<td>(2) &amp; (3.) x</td>
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<tr>
<td>Teacher interaction with students once lesson has started</td>
<td>Does the teacher circulate within room? Work on other items not related to the lesson? Coach or direct students?</td>
<td>(1) Evidence of how (2) Evidence of conceptualization – what is important (3.) Evidence possible link</td>
<td>Field notes</td>
<td>(2) &amp; (3.) x</td>
</tr>
<tr>
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<tr>
<td><strong>Student Project</strong></td>
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<tr>
<td>Type of VDL Project</td>
<td>What media is used? Still Digital media (example Word, PowerPoint, Publisher) Video, Digital Photos, Other</td>
<td>(1) Evidence of how &amp; why</td>
<td>Notes about artifacts or actual artifacts</td>
<td></td>
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<tr>
<td>What happens to student project when completed?</td>
<td>Does the project remain only accessible to the student/s creators and teacher or is it published in some way</td>
<td>(2) Evidence on of the following: Summation of learning, process- strategy for learning, or vehicle for publishing and communication ideas (3) Evidence of teacher beliefs of about VDL</td>
<td></td>
<td>2) &amp; (3.) x</td>
</tr>
<tr>
<td>How is lesson evaluated?</td>
<td>Evidence of teacher’s beliefs of about VDL If no rubric is used how is project evaluated, how? Is product not graded at all</td>
<td>(1) Why? – evidence teacher’s belief – graded or not (2) Conceptual evidence – group work or summative product</td>
<td>Rubric if any</td>
<td>(2) &amp; (3.) x</td>
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<thead>
<tr>
<th>Data - What</th>
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<th>Research Question Importance – So What?</th>
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<th>Member Check Needed</th>
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</thead>
<tbody>
<tr>
<td><strong>Artifacts</strong></td>
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<tr>
<td>Teacher’s Rubric for Evaluation</td>
<td>What items are being used for evaluative process?</td>
<td>(1) Why? – evidence teacher belief – graded or not (2) Conceptual evidence – group work or summative product (3) Evidence of link</td>
<td>rubric</td>
<td>(2) &amp; (3.) x</td>
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<tr>
<td>Teacher’s Lesson Plan</td>
<td>What learning object are stated</td>
<td>Evidence for (1)</td>
<td>Copy of plan lesson plan</td>
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<tr>
<td>Teacher’s Video of lesson</td>
<td>Simple used to remind me of data observed</td>
<td>all</td>
<td>tape</td>
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# Appendix F

## End of the Year Overview of VDLs

<table>
<thead>
<tr>
<th>Name of Project &amp; Software</th>
<th>Subject</th>
<th>Time Frame</th>
<th>Targeted 1 or 2 skills</th>
<th>Culminating Unit Project</th>
<th>Individual, Pairs, or Group</th>
<th>Did you use a pre-made sample or demo</th>
<th>Graded Yes or No</th>
<th>Was the project saved?</th>
<th>Was it displayed? (Hall or Score)</th>
<th>Was the product used in a presentation?</th>
<th>Do it next year?</th>
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Katrina Negley graduated from James Buchanan High School, Mercersburg, Pennsylvania, in 1978. She received an Associate Degree in Specialized Technology from Art Institute of Pittsburgh in 1980, a Bachelor of Science in Art Education from Indiana University of Pennsylvania in 1983 and a Masters Degree in Art Education from Virginia Commonwealth University in 1991. Katrina was previously employed as an art teacher for 19 years, with experience at all grade levels. For the last five years she has worked as an Instructional Technology Research Teacher at two elementary schools. Katrina taught professional development courses for county as well as two local colleges.