Patterns of 4th graders' literacy events in web page development

Rewa Colette Williams

University of South Florida
Patterns Of 4th Graders' Literacy Events In Web Page Development

by

Rewa Colette Williams

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy
Department of Childhood Education
College of Education
University of South Florida

Major Professor: Jim King, Ed.D.
Susan Homan, Ph.D.
Mary Lou Morton, Ph.D.
Frank Briet, Ph.D.

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Preface

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Dedication

This dissertation is dedicated to all women who have a dream of something more for their life and refuse to stop until they attain it.
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Patterns Of 4th Graders' Literacy Events In Web Page Development

Rewa C. Williams

ABSTRACT

This study describes in-class and home literacy events that occur when students work in groups to create web pages as evidence of learning the academic content that was presented within a fourth grade classroom. The constructivist approach to learning was the underpinning idea examined as well as its connection to technology and group work. Data were collected in a variety of ways to obtain a picture, as comprehensive as possible, of the oral, listening, viewing, and written on-task communication and interactions that occurred. As the in-class and home literacy events emerged, the competencies and strategies that students used while interacting with traditional text were uncovered. These events encompass the strategies that the students used after they encountered the text and had to modify for one reason or another. These literacy events illustrate how the Internet supports reading and writing in the elementary classroom when it is utilized as a tool for promoting instruction.
CHAPTER I

Introduction

For many years, educators at all levels have been faced with the task of integrating technology into the existing curriculum. The Internet appears to be a viable solution to technology integration. There are a number of publications and web sites that explore using the Internet as a teacher resource for creating lesson plans (Grabe & Grabe, 2000; Story-Huffman, 2002; Teacher.Net Web Services, 2003), searching the web (Becker, 1999; Nellen, 1998; Provenzo, 2002; Scholastic Inc., 2003), and developing helpful teaching strategies (Jones, 2003; Mantoione & Smead, 2003).

Many educators have also tapped into the Internet as a resource for students to research, explore, and present various topics of study. It provides its users with instant information at the click of a button. Students can create web pages to share information, stories, and projects with their classmates or students across the world. Student-created web pages provide authentic opportunities for students to present new knowledge in ways that go beyond a standard paper-pencil format (McTighe & Ferrara, 1994; Stoiccheva, 2000). As educators find ways to integrate technology into the curriculum, new technologies have materialized. These technologies have caused society to transform its idea of what it means to be literate. New views on literacy have emerged. In the past, literacy has been defined in various ways from being able to sign one’s name (Goodsell,
1923) to workforce literacy and literacy as a means for a democratic society (Graff, 1995). As the demands of the society change, so does the definition of what it means to be literate. Present and past definitions all have some aspect of reading and writing as well as some minimal level of practical proficiency (Cunningham, 2000). As technologies emerge, new applications for literacy skills create a need for ‘new literacies.’ New literacies are competencies and strategies that students utilize to retrieve and communicate new knowledge (Leu, 2002). Rapid changes in the way we communicate, via the Internet, are taking place and redefining the world of learning (Leu, 2000). These changes have occurred as a result of the growth in information technology and new literacies which lead to associated multiliteracies (Alvermann & Hagood, 2000; Cope & Kalantzis, 2000; Kellner, 2000; Luke & Elkins, 1998; Tyner, 1998) including digital literacy, media literacy, information literacy, and technology literacy. These multiliteracies have implications for the way language is constructed and used. “Multiliteracies can be better conceptualized as elements subsumed under the broad and flexible umbrella of literacy” (Tyner, 1998, p. 66). With the introduction of the concept of multiliteracies, past definitions of literacy will take on an even broader scope to determine what literate competence might entail. Schools will have to move beyond the prior concept of literacy as paper and pencil tasks and the notion that literacy is a set of skills to be taught, tested and standardized.

Statement of the Problem

The use of the Internet allows the fields of literacy and technology to converge by introducing readers to intermediality: “the ability to work with diverse symbol systems in an active way where meanings are both received and produced” (Semali & Watts-
This term was adapted from the concept of intertextuality defined by Beach & Bridwell (as quoted in Harris & Hodges, 1995, p. 122) as the “construct that meaning derives from readers’ transaction(s) with the text in which [they] apply their knowledge of literary and social convention to that text.” Current research on new literacies often addresses applying new views of traditional literacy acquisition rather than on the aspects unique to multiliteracies (Leu, 2002). New literacies and their associated multiliteracies have created digital forms of expression that are rapidly emerging alongside printed forms (Reinking, 1998). Further research is needed to address the issues related to these digital forms, such as web pages, as well as the implications they have on literacy development. Research on web site development in the elementary grades is minimal. The foci of technology studies on the elementary school level examine the integration of software programs in various subject areas, drill and practice, and keyboarding skills. Current studies in educational technology that research web site design are on the middle or high school (Loh & Williams, 2002; Maring, Wiseman, & Myers, 1997; Maslin & Nelson, 2002; Scarcella & Modica, 1998) and pre-service teacher level (Benson & Bruce, 2001; Bento & Bento, 2000; Tanner & Hood, 1997). Most of these studies are quantitative and examine web-based instruction and navigating the World Wide Web and do not adequately address the role of literacy. Research is growing and changing as new literacies emerge. However, we know very little about how to support multiliteracies in classrooms and even less about how the Internet supports reading and writing in the elementary classroom (Leu, 2002). Research on elementary students’ web page design as well as the accompanying multiliteracies is
an underdeveloped area and needs to be examined further to determine what role, if any, these new literacies play.

Purpose of the Study

The purpose of this study was to describe and interpret the literacy events that occurred when students worked in groups to create web pages as evidence of learning the academic content [e.g. theme, strand, or topic of study] that was presented within a fourth grade classroom. Examining the literacy events as students created web pages shows how the Internet supports reading and writing in the elementary classroom when it is utilized as a tool for promoting instruction. This study will add to the growing body of literature in the fields of literacy, elementary education, and especially technology.

Significance of the Study

This study was conducted for both theoretical and practical reasons. Theoretically, quantitative researchers have conducted the majority of research in the field of educational technology. Qualitative methodologies are needed to “assess the complexities and subtleties of knowledge construction” (Jonassen & Reeves, 2001, p. 714). A case study approach (Patton, 2002) was used to examine the patterns of literacy events that emerged as students worked in groups to create web pages. From a practitioner’s perspective, some form of technology has become a tool that is used in some aspect of everyday life. Technology standards are being eased into the school curriculum and teachers need to be aware of the dynamics, benefits, and challenges of using technology as a tool for learning and instruction. This study examined literacy events outside of the reading curriculum by observing the creation of a multimedia project during a science group assignment. This study seeks to provide classroom
teachers with viable alternative measures to assess their students’ acquired knowledge and procedural understandings.

Research Questions

The research questions identified by this study were broad in scope, as is consistent with qualitative inquiry. They were developed to provide a better understanding of the literacy events that occur in other subject areas. The research questions addressed by this study were as follows:

What literacy events, new/traditional, occur as 4th grade students work in groups to create web pages?

How did these literacy events differ from one another?

The first question focused on what new and/or traditional literacy events actually occurred while students created web pages. To answer this question it was important to constantly compare the groups to see what themes emerged. The second question helped clarify how the Internet adds to the learning experience. The two questions guided the design, data collection, and analysis of the study. The answers to these questions were meant to pertain only to the students participating in the study, so the results should not be understood as representing all students.

Definition of Terms

There are several terms used frequently throughout the study that have varied meanings. In order to be specific when describing the form of the study design and to be clear when discussing the theory and research behind it, these terms require operational definitions for the duration of the project.
• Literacy events – For the purpose of this study, a literacy event will refer to any oral or written on-task communication or interaction that takes place within the group planning and implementation of the design of the web page (adapted from Heath, 1983).

• Intermediality – For the purpose of this study, intermediality will refer to a reader’s transaction with web-base text that contains features not typically found in printed text, such as graphics, hyperlinks and video clips (adapted from Semali & Watts-Pailliotet, 1999).

• Web Page – The term web page will be used to describe the multimedia project that the groups of students will create. It refers to a document containing information, which is loaded from the World Wide Web (adapted from Florida Center for Instructional Technology, 1995).

• Academic Content – Academic content refers to a theme, strand, or topic of study presented by the general education teacher to fulfill the fourth grade level expectations for the Florida Sunshine State Standards (adapted from Florida Department of Education, n.d.).

• Group Work – Group work refers to a heterogeneous group of four or five students working together and aiding each other in completing an academic task (Jacob, 1999; Parker, 1985).

• Multimedia Project – The term multimedia project refers to the final product, a group web page, created by the students using the computer as a tool for instruction. This project provides students with the opportunity to construct,
share, and disseminate information using text, sound, and graphics (Wepner, Valmont, Thurlow, 2000; Willis, Stephens, & Matthew, 1996).

- **New Literacies** – For the purpose of this study, new literacies refer to the text related competencies and strategies students utilize as they retrieve and communicate new knowledge from multiliteracies (adapted from Leu, 2002).

- **Multiliteracies** – For the purpose of this study, multiliteracies refer to emerging new literacies that move beyond reading, writing and listening skills by using technology as a tool for communicating and gathering information (Leu, 2002; Reinking, 1998).

**Limitations of the Study**

The limitations of this study include limits on generalizability of the findings, the researcher’s success agenda, and the restricted access of the Internet. This study represented one single case study of six groups of fourth graders’ experiences designing a web page. The classroom community and set up as well as the researcher’s involvement were unique to this study. The relationship that was fostered throughout the school year affected the outcome of this study so generalizability is limited.

The researcher may have imparted her perspective onto the classroom situation as well as the project. As a participant observer and a technology volunteer in the classroom, the researcher was knowledgeable of the abilities of the students before the study began and provided assistance to those who were struggling or needed extra assistance. This caused the researcher to have confidence that this project would be successful which affected the results of this study and may be considered a limitation.
Another limitation to this study was the restricted Internet and computer access. This limitation may have affected the outcome of this study because although the participants were taught how to save pictures from the web and to post a document on the web, they were not able to actually perform either of these tasks due to restricted access.

Summary

This study explored the convergence of literacy and technology by examining the patterns of literacy events that occurred while fourth grade students worked in groups to create web pages as evidence of learning the academic content. The breadth of literature informing this study incorporated literacy and technology theories, which include transformation, convergence and cognitive flexibility. Constructivist thought (Brooks & Brooks, 1999; Duffy & Cunningham, 2001; Spivey, 1997; Vygotsky, 1978) was behind the design and implementation of this study as students worked in groups to communicate ideas and use technology as a tool for authentic learning experiences. This study was designed to further theory on how technology as a tool can aid and support literacy learning.
CHAPTER II

Literature Review

Although the Internet was developed over thirty years ago, the World Wide Web has only been in existence for a little over thirteen years and educators only began to show interest in it as a tool for learning in the late 90s (Dietel, Dietel & Nieto, 2000). With the advent of Internet use by educators, teachers are allowing their students to create web pages as evidence of learning. School web sites that display students’ work are becoming increasingly prevalent on the World Wide Web (Loh & Williams, 2002).

There are an ample amount of web design books (Barrett, Levinson & Lisanti, 2001; Castro, 2000; Dietel, Dietel & Nieto, 2000; Krug, 2000; Niederst, 2001; Spainhour & Eckstein, 2003) that provide basic step-by-step detailed instructions for anyone who desires to create a web page. However, because educators only recently began incorporating web design into the curriculum, classroom research has been limited to the basic design of a web page and the elements that should be included (Loh & Williams, 2002; McKillop & Myers, 1999; Myers, Hammett, & McKillop, 1998; Myers, Hammett, & McKillop, 2000; Patterson, 2000).

This literature review addresses literature related to various theoretical frameworks that encompass literacy, group work, and technology. First, the theoretical framework of the study will be discussed, focusing on the theories of transformation and convergence within the context of literacy and technology. Second, the constructivist approach to learning is examined as well as its connection to technology. Third, the
theory of cognitive flexibility within the context of literacy and technology will be discussed. Next, research on group work including its connection to technology is discussed. Lastly, the role of technology, including web page design, and its relationship to authentic assessment and standards will be explored. All of these areas contributed to the research question and design of the study.

Transformation of Literacy Theory

The term ‘literacy’ has evolved over the last century. A single definition of literacy has not been developed due to the continuum in which the concept falls. This continuum includes an individual’s competencies, knowledge, skills, and social practices, which are influenced by their gender, age, and education (Harris & Hodges, 1995; Leu, 2000; Venezky, Wagner, & Ciliberti, 1990). Commonalities between present and past definitions of literacy include a level of proficiency with some aspect of reading and writing as well as societal demands forcing the changing shape of what it means to be literate (Cunningham, 2000). With the influx of digital technology the definitions of literacy are being transformed and this transformation involves all aspects of our society. Reinking (1998) proposes that the term transformation involves a connection between an earlier idea and an emerging form of that idea. Literacy educators are being called upon to transform the concept of literacy (Costanzo, 1994, Reinking, 1994) to include digital forms of reading and writing along with the use of multiple symbol systems’ (Flood & Lapp, 1995), such as hypertext, links and graphics. “The increasing prevalence of electronic forms of communication promises to transform the acts of reading and writing by virtue of the unique characteristics of electronic text” (Reinking, 1998, p. xvi).
Technology has changed the way in which information is accessed. The Internet provides readers with instant access to an unlimited amount of information. Digital forms of reading and writing, such as spell check, grammar check, e-mail, hypertext, and electronic books, have undefined consequences for the ways reading and writing are taught (Karchmer, 2001; Leu, 2002; Reinking, 1998). For centuries, books have been the foundation of our society in the areas of education, religion, and democracy. We are heading towards a time when digital texts will be practical alternatives to printed texts. Reinking (1998) foresees a world where printed texts are no longer dominant. However, today both types of texts currently co-exist, often without overt competition or comparison. They typically each serve different purposes. The organizational structure of printed text is linear as ideas are developed in a logical sequence. In contrast, the reader determines the sequence in which the digital text, known as hypertext, will follow as they shift away from an emphasis on the reading of words and move to a recognition of symbolic elements (Lemke, 1998) which influence the path of the reader. As the Internet continues to be a viable resource for educators, digital text and the skills needed to read it, will aid in the transformation of what it means to be literate.

The growth in Internet use is transforming nearly every aspect of literacy. This transformation is creating new opportunities and challenges for teachers, students, and parents. Within the classroom, questions can be immediately answered by doing an Internet search instead of sending a student to the library to find the information. Parents and students have the ability to use the Internet to search for homework help and find out about school activities. Internet access can also be attained at public libraries and universities. This type of technology at our fingertips has aided in this transformation
and caused new views on literacy to emerge. “Digital forms of reading and writing represent a powerful stimulus for transforming traditional educational structures and practices” (Reinking, 1998, p. xii).

Convergence of Literacy & Technology Theory

According to Leu and Kinzer (2000), both literacy and technology educators are in the center of a convergence between the two disciplines. This convergence is reshaping the nature of literacy instruction (Leu & Kinzer, 2000). As technology changes at a rapid speed, literacy needs for the future are difficult to identify. The new literacies that emerge from these changing technologies have associated multiliteracies, which have implications for the way language is used. Educators can only imagine how the definition of literacy will change for students entering elementary classrooms five years from now based on the dramatic difference in the needs of students thirteen years ago when the Internet was non-existent.

As this convergence takes place, only speculations can be made about the forces that will shape the future literacy needs and changes in technology for students entering the world of work in the next decade. First, the US world-based economy promotes global competition. Businesses seek employees who have the ability to access, evaluate, and use information quickly and effectively to solve problems (Leu and Kinzer, 2000). The Internet is a helpful reference tool to retrieve information quickly, so employees who are adept at accessing and using information from it will become highly valued. Literacy and technology converge when teachers teach students the necessary skills to access information from the Internet to solve problems. This may have implications for
previous foci on comprehension as careful, deep processing. Such cognitive work could conceivably be less valuable in a ‘quick information’ environment.

Second, the Internet connects the global community. It provides access to other cultures and views as people connect with others throughout the world via web sites, e-mail, chat rooms, discussion boards, and list serves. As our access to information increases, the world becomes smaller, or closer, as our knowledge base grows. As educators provide students with access to the Internet as well as the skills necessary to navigate it, their potential contributions to the global community are increased (Leu, 2000). Technology and literacy converge when teachers teach students the skills needed to communicate with others via technology.

Third, because technology constantly changes, it forces the definition of literacy and the way technology is used in the classroom to change (Cunningham, 2000; Leu and Kinzer, 2000). The impact of multiliteracies on the present and future lives of students is widespread because of the changing nature of technology. Over the past few years, software and hardware changes have occurred so quickly that educators find it hard to keep current with what is new. Just as one type of technology is mastered and a comfort level is achieved, another one is created or an improved version is on the market. Literacy and technology converge when we develop the skills needed to adapt to these changes and apply them to learning.

Constructivist Approach

Technology has influenced the way in which students access, communicate, and interpret information. “Learners function as designers using the technology as tools for analyzing the world, accessing information; interpreting and organizing their personal
knowledge and representing what they know to others” (Jonassen, 1993, p. 7).

Technology, such as the Internet, allows students to manipulate the way text is negotiated. Reading digital text, known as hypertext, is not linear. It is a constant shift from one concept to another as students maneuver their way throughout interwoven ideas. When a reader approaches text, he or she brings a unique set of experiences and personal background knowledge. To construct meaning, the reader applies these experiences and background knowledge to the text. This meaning-making process stems from the constructivist perspective on learning, which involves social and cultural related influences. This view focuses on social and cultural processes that an individual interprets while actively constructing meaning within various interactions (Cobb, 1994; Cole & Scribner, 1974; Duffy & Cunningham, 2001; Tharp & Gallimore, 1988; Vygotsky, 1978; Wertsch, Del Rio & Alvarez, 1995). The context of learning is situated within social and cultural realms and its origins of cognition are also examined through that same lens.

Constructivism has been referred to as an approach, a learning theory, a philosophy, a metatheory, a view, a framework, and as an epistemology (Duffy & Cunningham, 2001; Rogoff, 1994; Spivey, 1997; Vygotsky, 1978; Wertsch, 1991). Constructivism supports the belief that readers reflect on their experiences as well as activate their background knowledge. Readers construct their own knowledge “from the inside, in interaction with the environment” (Kamii, 1991, p. 17). Individuals generate their own rules and mental models, which are used to make sense of their experiences. As learners gain new knowledge, existing schemas are expanded and new classifications are created (Piaget, 1973; Vygotsky, 1978).
There are guiding principles of constructivist thought that several researchers agree upon; (1) learning is an active process in which learners search for and construct meaning, and (2) instruction is a process of supporting that construction (Brooks & Brooks, 1999; Duffy & Cunningham, 2001; Spivey, 1997; Vygotsky, 1978). Within the constructivist framework, learning is seen as a social activity associated with connecting with others. These theorists recognize the social aspect of learning and suggest using conversation and interaction as part of the learning process.

Educators who exercise this constructivist philosophy toward learning understand that thinking and learning are social processes; that learning is an active process, requiring participation and engagement for knowledge to be constructed; and that meaningful learning is situated in the context of everyday teaching. This perspective allows teachers to understand the views and experience of students as well as engage them in actively creating knowledge by making learning relevant and applicable to real world situations. The use of constructivist teaching calls for curricular changes that are customized to students’ prior knowledge and emphasizes hands-on problem solving rather than a standardized curriculum. Educators must focus on helping students make connections with new information being presented in classrooms. Instruction should be tailored to student responses, which allow and encourage them to analyze, predict, interpret, and discuss that new information (Brooks & Brooks, 1999; Pea, 1994).

**Constructivism & Technology**

The impact of multiliteracies on the present and future lives of students is widespread because of the changing nature of technology. As these multiliteracies influence students’ understandings of the world around them, learners need to be aware
of how their interaction with others influences their construction of meaning. Learners reconstruct, re-conceptualize, and re-position an experience as they research, imagine, and invent new information (Fosnot, 1989). Through technology, individual learners have the opportunity to access the entire learning community to construct knowledge. Tasks are shaped and changed by the technology and the social interactions that are taking place (Lave, 1988; Pea, 1994).

Educators throughout the world have adopted technology as a tool for learning (International Society for Technology in Education, n.d.). With this widespread use of technology in the schools, teachers have been expected to integrate and deliver effective technology instruction. Multiliteracies require educators to examine the possibilities that technology has to offer. When teachers and students use technology as a tool for learning, to acquire content and skills, they also must explore the new ways of understanding and endless possibilities that technology imparts (Duffy & Cunningham, 2001; Pea, 1994). “Technology permits us to provide a richer and more exciting (entertaining) learning environment that will better engage the student in learning the material being presented” (Duffy & Cunningham, 2001, p. 187).

Technology provides ample opportunities for classrooms to be set up as constructivist learning environments. Grabinger (2001) describes rich environments for active learning, or REALs, which are based on constructivist theories and values. REALs provide learning situations that actively engage students in activities that promote collaboration, autonomy, and reflection. This engagement helps to build and shape understanding that is socially embedded within the context of the learning environment (Forman & Pufall, 1998; Fosnot, 1989; Goodman, 1984; Grabinger 2001; Lebow, 1993).
Technology’s relationship to rich environments for active learning deals with the cognitive tools within the learning environment that assist and support a student’s cognitive processes. Jonassen and Reeves (2001) explain that cognitive tools “refer to technologies, tangible and intangible, that enhance the cognitive powers of human beings during thinking, problem-solving, and learning” (p. 693). Examples of cognitive tools are databases, spreadsheets, multimedia software, hypermedia software, and computer programming languages. These tools are most effective when they are applied within the constructivist learning theory. Learners use these cognitive tools to construct their own knowledge and enable them to ‘engage in active, mindful, and purposeful interpretation and reflection. The real power of computers to improve education will only be realized when students actively use them as cognitive tools.” (Jonassen & Reeves, 2001, p. 695).

Theory of Cognitive Flexibility

The theory of cognitive flexibility takes constructivism one step further by having the reader draw upon a personal schema and then reorganize that schema to fit a new, more complex situation (Spiro, Feltovich, Jacobson, & Coulson, 1991). It promotes a flexible use of prior knowledge to construct and understand. This flexibility goes beyond the information provided by the text and the readers’ prior knowledge is acquired, reconstructed, and applied.

As students navigate the World Wide Web, they come in contact with hypertext and meaning is constructed. Hypertext is digital text encountered on the Internet that allows the reader to choose the sequence of how text is read (Deemer, 1994; Jonassen, 1986). Students not only construct meaning from hypertext, but also through the various choices of links and graphics that direct them to further information. Readers can “forge
cross-connections to subtopics, to make directional choices” (Spires & Estates, 2002). The path readers select is unique based on their personal connection to the information provided as well as the links between prior knowledge and the new information that is encountered. The World Wide Web can provide an ideal situation for readers to practice cognitive flexibility. The Internet requires readers to regroup known ideas and apply new ideas as problems are solved and questions are answered. Hypertext links ideas together and the reader chooses the order and selection that the text will be read depending on their individual needs and interests. “Hypertext facilitates flexible restructuring of instructional presentation sequences and multiple linkages among content elements” (Spiro et. al, 1991). By using the Internet to criss-cross between ideas, information is accessed, analyzed, and represented in a new way and technology becomes a channel for the construction of knowledge (Owens, Hester, & Teale, 2002).

In summary, theories of transformation, convergence, constructivism and cognitive flexibility provides the theoretical background for why a study of the literacy events that occur when students work in groups to create web pages in the elementary school is relevant and timely. The impact of technology is currently affecting various aspects of students’ lives and will be even more prevalent in the future. Preparing students for emerging multiliteracies begins with a better understanding of the literacy events that are occurring as these new technologies are integrated into their lives. One part of that understanding is how students communicate in the classroom.

Oral Communication

The communication process continually influences student learning. Each learner is a sender and receiver of messages and as learners interact with others through talk, new
and more complex responses are stimulated. Unless the act of speech is being performed, its role in learning is often undervalued (O’Keefe, 1995). However, through discussion and interaction with others, students naturally compare situations to their own experiences and their knowledge base is expanded (O’Keefe, 1995). As students receive immediate feedback from others during discussions, the aspect of oral language heightens and becomes much more important to the learning process. The role of talk was essential in this study because students worked in groups and communication was a vital component during the completion of the multimedia project.

*Classroom Talk*

Talk is fundamental to the communication process and is often transparent in the classroom. Classroom talk takes on several functions depending upon its context. Educators have been concerned with language as a means to learn instead of just learning language. Michaels and Foster (1985) believe that classrooms can be characterized by the amount of talking that takes place within them and by who does the talking. Research has shown that the teacher does the majority of talk in classrooms (Alvermann, Dillon, O’Brien, 1987; Cazden, 1988; Stubbs & Delamont, 1976; Dwyer, 1991; Freedman, 1993). Stubbs and Delamont (1976) conducted a study showing that the teacher is talking two thirds of the time. Dwyer (1991) and Cazden (1988) both discuss ways that teacher talk is used to control the learning environment. Most times, teacher talk is used to assure that the classroom is organized and that students are being productive. Freedman (1993) investigated teacher talk and noted that students take their learning cues from the adults around them. Alvermann, Dillon, and O’Brien (1987) investigated the discussion practices that skilled teachers use daily. Although previous research on
teacher talk is important to how talk is studied in the context of the classroom, this was not the focus of this research study.

Types of Classroom Talk

Much of the research conducted on classroom talk has resulted in describing how teachers and students use language. Several researchers have observed classroom talk and classified it by type (Alpert, 1987; Barnes, 1992; Freedman, 1993; Gutierrez, 1995; Mehan, 1979). Alpert’s (1987) ethnographic study of three high school English classes examines instructional strategies evident in different kinds of classroom conversation. Classrooms were identified as active, controlled, or silent. Active classrooms generally opened the discussion by posing a question or statement for student response. Students responded to each other and teacher input was minimal. However, in controlled classrooms, the discussions involved the teacher restricting student’s responses by responding to or following up on each student’s reply by either rephrasing, repeating, clarifying or extending their response. The silent classroom was characterized by little student talk and an overwhelming amount of teacher talk.

Barnes’ (1992) work has lead to distinguishing between two different types of talk, exploratory and presentational talk. Exploratory talk occurs when ideas are not fully formed and presentational talk is when the teacher gives specific information. Barnes’ (1992) study found that both types of talk are found in successful classrooms. Freedman (1993) extended the work of Barnes (1992) by adding another type of talk that she labeled ‘shared talk.’ This type of talk incorporates both exploratory and presentational talk because the teacher may follow the lead of a student in determining the discussion topic and sequence of the conversation.
Gutierrez (1995) examined classroom discussions and identified three scripts that are ongoing within the classroom environment, teacher script, student counter script, and the third space. The third space is similar to Freedman’s (1993) shared talk in that the teacher and the students work together to negotiate meaning as they actively participate as speakers and listeners. Mehan (1979) describes yet another type of talk in classrooms. It has been identified as ‘talk around the edges’ (p. 71) and can be described as ongoing talk during teacher talk. The knowledge or awareness of various types of talk aided the researcher in describing the literacy events that occurred within the classroom group discussions.

Student Talk

Discussion is one avenue to support the emphasis on the importance of interaction with others within the constructivist approach. Chomsky (1979) stated that language is used in many different ways and serves essentially as the expression of thought. Vygotsky (1978, 1986) also considered oral language and social interaction important in achieving higher-level thought and learning. Vygotsky (1978) considered the importance of students talking and interacting prior to attempting a personal, solitary response when he declared, “Every function in the child’s cultural development appears twice: first on the social level, and later, on the individual level: first between people (interpsychological), and then inside the child (intrapsycholoical)” (p. 57).

Cazden (2001) stated that student talk must be considered differently, depending on whether the talk is between learners and an expert or among peers. Bloome and Theodoreau (1988) stressed the need for students to meet the social and academic demands of lessons as they simultaneously attend to maintaining peer relationships. The
manner in which they balance these two demands influences their participation in lessons and how knowledge develops within the context of the classroom. They found that lesson patterns are predictable and student speech is restricted. However, this study is limited in what it can reveal about how children construct meaning and develop knowledge through talking because students appear to have mastered the rules for participation by using the teacher’s cues to formulate answers and often adopt the teacher’s language without understanding it (Cazden, 2001).

Research on student talk in classrooms that does not follow the traditional three-part sequence of lesson discourse (teacher elicitation-student response-teacher evaluation) has discovered some interesting aspects of student talk. For example, Newkirk and McClure (1992) observed classroom discussions and found that students did not always follow the modeled forms of responses accepted by their teachers but instead created a different agenda. The students included sound effects, reenactments, and word play in their discussions and their responses were richer and contributed to friendliness, camaraderie, and humor. The researchers suggest that students come to the discussion groups as members of a rich oral culture that has its own repertoire of responses.

Booth and Thornley-Hill (1991) conducted a three-year research project that explored talk within the context of classroom learning. Over the three years, eighty teachers participated in classroom-based research projects that focused on observing children engaged in activities that required conversation to understand the nature of learning. The findings indicated that 1) one-to-one interaction was important in the acquisition of language, 2) teachers that listen to students’ talk find it easier to meet individual student needs, 3) the use of talk in the classroom results in positive changes in
student’s behaviors and attitudes, and 4) problem solving was unique to each group discussion.

Michaels and Foster (1985) observed classroom talk in the form of storytelling by first and second grade students. They found that the teachers who listened to these stories were able to link the academic content to the knowledge and experience base of their students. Dudley-Marling and Searle (1991) elaborated on the importance of relating to the students’ personal experiences as they observed a third grade classroom. In this classroom students used talk about their personal experiences to build the context that expanded their understanding. Both studies suggest that this type of talk is important as students connect their personal experiences and learning to shape their views.

Thus far, research studies that depict the positive side of student talk have been discussed. However, Jones (1988) illustrates another view of student talk where some students may feel that the teacher does not respect student talk and that small-group discussions do not have much value. Barnes (1992) states that when students have this attitude, they put forth little effort and teachers blame them for the lack of group discussion. Getting students to value talk in the classroom, when they have not practiced it earlier, takes time. Teachers of older students will have to be patient as they try to change students’ attitudes and practices regarding talk in the classroom (Dudley-Marling & Searle, 1991). Because the present study took place in an elementary classroom where group work and class discussions are utilized often and valued by the classroom teacher, the negative attitudes regarding classroom talk were less important.

Many researchers agree that classrooms that cultivate peer discussions result in conversations about text that engage students in higher levels of processing and foster
meaning construction (Almasi, 1996; Alpert, 1987; Cazden, 2001; Eeds & Wells, 1989; O’Flahavan, Stein, Wiencek & Marks, 1992). Discussion also provides students with the opportunity to interact with each other and articulate their ideas as well as change their interpretations as they hear alternative views.

As readers interact and discuss instructional material, a transaction occurs between the reader and the text as viewed through the ways a reader responds to the text. Rosenblatt’s (1978) transactional theory of literacy emphasizes the active interplay between the reader, the text, and context as essential components in the construction of meaning. The reader interprets the text based on prior knowledge and no longer is thought of as a passive receiver of information. The learner is now an active participant in making meaning through interaction with the text. As the reader continues to read and/or share ideas, the interpretations may change or unfold. “Children’s talk provides a rich source of information about how they negotiate meaning in the process of learning” (Leal, 1992, p. 313). When students have the opportunity to discuss information with their peers it helps them corroborate, amend and expand their initial individual interpretations (Cazden, 2001; Eeds & Wells, 1989; Leal, 1992; Rosenblatt, 1976).

Sociolinguistic research, like Cazden’s (2001), is useful in bridging the gap between literacy theory and the social context that impacted it. Technology and literacy converge when students are taught the appropriate skills that are needed to use technology to communicate with others. Technology takes discussions to another level and allows students to combine the school culture with their home culture.

Discussions provide students with the opportunity to interact and engage with one another. Students can discuss possible solutions to problems, share ideas, and reflect
upon their thoughts. As this discussion process takes place, students activate their prior knowledge and trigger memories of learned information that will help them connect and process the new information (Gokhale, 1996).

**Group Work**

*Historical Background*

Research related to students working in groups, dates back for more than one hundred years. In 1896, Dewey developed a cooperative family school community that was child-centered and was based on the doctrines of growth, activity, initiative and self-expression (Rugg & Shumaker, 1969). One of his former students, Kilpatrick, implemented Dewey’s social views on education by developing a project method into the school setting. This method allowed the students to learn how to organize materials, select essentials from non-essentials, be self-reliant, and get along with others (Rugg & Shumaker, 1969).

Research on group work began to emerge in the early 1900s. In 1903, Mayer conducted a study that investigated solitary versus group behavior during various subject area class assignments. His results found that while the assigned class work was completed faster, the quality of the work decreased under group conditions. May and Dobb (1937) reported that in 1913, Moede introduced social dimensions in which students performed the same judgments in isolation and in groups. Paralleling this study, Allport (1924) conducted research involving social psychology that explored the stimulus and reaction of individuals and their peers. Allport found that a greater uniformity of achievement and social conformity occurred with grouping. His findings also resembled Mayer’s earlier study where the speed increased but quality of work decreased in several
of the group situations. At this time, research also found its way into Teacher’s Colleges and one director, Rugg, developed texts to accompany group based activity projects and became significantly involved in the group learning approach (Rugg & Shumaker, 1928).

During the 1930s, May and Dobb (1937) continued to research group learning and reported that cooperation and competition were both learned forms of behavior and that one form was not more natural than the other. This research led to Lewin’s (1935) work on school climates in children’s groups. He found that leadership can be learned and was not inborn. In 1949, Deutsch’s doctoral dissertation on the effects of competition and cooperation on group processes involved fifty introductory psychology students. The students were placed in two groups, cooperative or competitive. He found that cooperative groups displayed more division of labor, more friendliness and acceptance of other’s ideas, more agreement, less anxiety, more helpfulness, fewer communication difficulties, and more productivity. The findings also indicated that the competitive groups were found to exhibit more aggression and more disagreement with one another. He continued his research on group processes and later examined the factors that contribute to the decision to cooperate or compete. He found that trust and suspicion are relevant factors involved in student’s decisions to cooperate.

In the late 1970s and early 1980s, efforts were made to incorporate Deutsch’s research findings into the classroom and emphasize student-to-student interaction. Research on interaction patterns were systemized, programs were conducted to extend cooperative practice and concrete teaching strategies were researched (Johnson & Johnson, 2001). Since the 1970s, several different methods of group learning have been developed and researched. This research has lead to various definitions of group work
that have emerged from the concept of cooperative learning. For the purpose of this study, group work was defined as a heterogeneous group of approximately five students working together and aiding each other in completing an academic task (Jacob, 1999; Parker, 1985).

Further research on group work, conducted by Johnson (1976), has examined student perceptions of cooperation and competition in relation to three different science programs as well as student preference of cooperative or competitive interactions. This study involved 108 sixth graders and found that the students preferred the cooperative approach where students were free to ask questions of their peers and their teacher. Researchers continued validating the use of group work in the classroom. Four types of cooperative learning were introduced in the early 1990s. The types were a) formal cooperative learning, b) informal cooperative learning, c) cooperative base groups, and d) academic controversy (Johnson & Johnson, 1992; Johnson, Johnson & Holubec, 1992, 1993; Johnson, Johnson & Smith, 1991). Formal cooperative learning is where students work together to jointly achieve specific objectives prescribed by the teacher. The teacher monitors and evaluates students’ learning as they complete assignments. Informal cooperative learning is a temporary learning experience that consists of students working together to achieve a joint learning goal. However a cooperative base group is an ongoing, heterogeneous group of students. Its purposes are “to give support, help, encouragement, and assistance each member needs to make academic progress and develop cognitively and socially healthy ways” (Johnson & Johnson, 2001, p. 1019). The last type of cooperative learning situation is academic controversy. Academic controversy is the process that students engage in when their opinions and ideas differ
from one another and they look for ways to reconcile that conflict (Johnson & Johnson, 1992).

**Benefits of Group Work**

Research findings over the past thirty years indicate many benefits for the use of group work in the elementary classroom. Some of these benefits are enhanced problem solving skills, improved enjoyment of the class, boosted academic achievement, and improved social relations among the students (Brophy, 1986; Gokhale, 1996; Hollifield, 1985; Jacob, 1999, Johnson & Johnson, 2001; Parker, 1985; Slavin 1990; Zipperer, Worley, & Sisson, 2002). One of the key elements to the success of group work is the interdependence among the group members on one another towards a common task. Slavin (1990) suggests that positive results are yielded when students work in groups because success affects the entire group and academic tasks become valued by peers. Students tend to help each other and group work creates a less threatening atmosphere. Heterogeneous group arrangements allow for students to improve their understanding and increase their concern for one another (Hollifield, 1985). One advantage of working with students from various ability levels is that low and average ability students have the advantage of working with and learning from high ability students. This in turn, allows the high ability students to learn even more by teaching the rest of the group members (Johnson & Johnson, 2001). Additional benefits are that students are involved in an active exchange of ideas within the group, which promotes critical thinking, leads to an increased interest among group members, and information is retained longer (Gokhale, 1996).
The Jigsaw Technique

Multiple methods and techniques have been developed to optimize group-learning instruction. One of those methods is the Jigsaw Approach to cooperative learning, developed in 1971 by Aronson (1997). This technique requires the entire class to be separated into groups of five to six students each. The groups of students are then assigned a topic to study. Each student is responsible for researching a portion of the topic individually and then reporting back to their group at a later date. Students from each group, who are working on the same topic, can meet and discuss their findings to ensure accuracy prior to sharing the information with their group. The Jigsaw technique encourages group members to participate with each other and also encourages “listening, engagement, and empathy by giving each member of the group an essential part to play in the academic activity. Group members must work together as a team to accomplish a common goal. The ‘cooperation by design’ facilitates interaction among all students in the class, leading them to value each other as contributors to their common task” (Aronson, 2000, ¶2).

Group Work & Technology

Researchers agree that students tend to generate higher level reasoning strategies, a greater diversity of ideas and procedures, and more critical and creative responses when they are actively learning in cooperative groups (Brown & Palinscar, 1989; Resnick, 1994; Riel, 1994). Groups of students can create multimedia projects, such as timelines, oral histories, iMovies, newspapers, and/or online journals. This type of collaboration can result in communities of learners where information is supported and exchanged.
This collaboration should be among students as well as between the teacher and the students. This community of learners shares their background knowledge and learns to negotiate meaning as they interact with each other and the text. “What the child is able to do in collaboration today he will be able to do independently tomorrow” (Vygotsky, 1978, p. 211).

The use of technology in the classroom may promote interaction and allow for the development of original projects reflective of group collaboration (Cyganowski, 1990; Wilson & Tally, 1991). However, when technology is added into a group assignment it may increase the difficulty of that assignment. The student’s task then becomes two fold, learning how to use the technology as well as mastering the information being presented within that technology. They also must learn teamwork skills and procedures as they work together to achieve an academic goal (Johnson & Johnson, 2001).

Technology

With the advent of new technologies in the classroom a whole new realm of educational possibilities have emerged. Over the past three decades, computers have been employed in multimedia presentations, instruction, and interactive learning environments. Chambers and Sprecher (1983) have suggested that teaching via computers encourages student interaction and involvement in the learning process.

Many students enter the public schools having had some type of computer interaction, whether it is with video game play or surfing the web (Lankshear & Knobel, 1997). These ‘computer-advantaged’ students have “access to a range of digital media and the tools to access and manipulate them” (McFarlane, 2000). Technology is constantly affecting the way we access information and communicate with others.
Research has “clearly not addressed the question of what basic cognitive processes are involved in using present technologies” (Kamil & Lane, 1998, p. 329).

**Literacy & Technology Connection**

This study involves creating web pages that will be posted on the Internet. The reading levels of the groups of students will determine what and how information is presented on their web page. As students search for information on their topic, they will encounter Internet text, known as electronic or hypertext, “a special type of data base system in which objects (text, pictures, music, programs, etc.) can be creatively linked together” (Webopedia, 2002, ¶2).

Literacy and technology converge when students read on the Internet. As students search the Internet for research or just browse the web, they utilize their reading skills. To be proficient at seeking, evaluating, and using information found on the Internet, readers must recognize features, navigate through, and apply their knowledge of the reading process to Internet text. The merging of these skills is encountered when students perform the simple task of searching the Internet for an online game.

**Hypertext**

Reading can be defined in various ways depending upon the context. It has been defined as an interactive model of text processing (Rumelhart, 1976) and as an interaction between the text and the reader (May, 1986). This process of interaction is established when readers read hypertext. When readers read hypertext, both the reader and the text are responding to choices made during the reading. The reader is able to actively manipulate the path used to gather information and construct meaning while the text
responds to the reader’s choices. Interaction within the mind of the reader and interaction between the reader and the hypertext unite to facilitate the reader’s construction of meaning (Leu & Reinking, 1996).

Bush (1945) developed hypertext when he created a reference system that allowed a user to create a path among information. Later, Englebart (1963) designed a system with a database of nonlinear text so when information was added, connections could be made to other ideas. In 1988, Nelson coined the term ‘hypertext’ as he referred to text that could be accessed in a nonlinear manner. He believed such a text would drastically change the way computer users worked with documents. Hypertext emerged as a new genre of text allowing users to connect ideas and easily access large amounts of information. In the field of education, hypertext is also frequently used in the form of CD-Rom as a tool for learning or in HyperCard as a tool for production. The Internet is an extension of or type of hypertext that provides readers with a connection to other computers connected to the Internet. From this connection, the reader has access to a seemingly unlimited source of web sites hosted by individuals, companies, or organizations. An understanding of hypertext develops a foundation for understanding Internet text.

Hypertext is digitized text in which ideas from different sources are connected together by links to nodes of information units. As the reader moves the cursor and clicks the mouse on an icon, word, or phrase they will be taken to another web page where an additional node of information is located. Hypertext is considered to be nonlinear because the reader can begin the text at any point and choose which idea to read next. The multilinear aspect of hypertext provides the reader with “divergent
approaches to reading, understanding, and learning” (Goldman, 1996, p. 8). Hypertext can be organized so that readers can easily use the patterns of nodes, once links are selected, to arrive at a particular node, regardless of the path they chose.

There are specific text qualities that make hypertext unique to other forms of text. Hypertext provides the reader with an easy way of searching for information by using links to move back and forth between documents. Information can be easily updated by the web master, which gives the reader access to the most current information. In conjunction with the hypertext, multimedia can be used to present information simultaneously through video or audio clips. Interaction between the hypertext and the reader allows the reader to address individual needs related to prior knowledge, interest, vocabulary, and reading speed.

Hypertext features also bring a unique set of challenges to readers. Not only must the Internet reader attend to the details of print, but he/she must also navigate or move easily through the hypertext in order to reach the full benefits of such a text. When reading hypertext, the reader focuses on the aspects of monitoring and control. The reader must constantly monitor his/her location within the hypertext while making decisions about where to go next. A list of hypertext features (Tierney, Kieffer, Whalin, Desai, Moss, Harris, & Hopper, 2000) describes ways the uniqueness of hypertext contributes to the reading act.

- Ideas are presented through buttons and scrolling so that the reader decides which pieces of text appear on the screen and where to begin and then proceed to.
• Links are created between ideas so that concepts can be defined, and examples or illustrations can be provided. The presentation of ideas becomes dynamic through the use of alphabetic text, graphics, and multimedia.
• Reading hypertext involves being able comprehend the text as well as navigating within and between web sites.

Navigating Electronic Text

Navigational tools for hypertext include links, icons, graphics, and multimedia. These tools can help a reader locate information, further develop, or define an idea.

Some research has shown that the attention to such navigational tools takes away from the reader’s ability to comprehend the text. In a study comparing hypertext and linear text, Gordon, Gustavel, Moore, & Hankey (1988) asked participants to read two articles, one in each format. After the reading, recall tests and question probes were given. Subjects answered significantly more questions with the linear format than the hypertext. Gordon et al. (1988) concluded the distraction of navigational decisions causes the reader to have a break in comprehension or the occurrence of ‘cognitive intrusion’. Hypertext structure seems to place an extra burden on the reader, possibly leading to less comprehension.

In contrast, Simpson and McKnight’s (1990) study showed how hypertext can aid in comprehension if it contains certain characteristics. They created eight versions of a document on plants and slight changes were made in the organization and features of each version. Subjects had the opportunity to read a version of the entire document several times then perform 10 information location tasks and construct a map of the document structure. Results showed that readers using a text with a hierarchical structure
navigated through the text more efficiently and produced more accurate maps than those readers using an alphabetic text.

Some studies show that using navigational maps can be helpful in letting the reader know where the links of a text lead before making a choice to explore a path. When a reader has a sense of the whole document or global visibility (Lai & Manber, 1991) more accurate predictions can be made about where a link will lead and the link’s usefulness to the reader. Dee-Lukas and Larkin (1992) found students could benefit from a well-organized content map of the hypertext. But within the same study, this finding was reversed when students were given a specific learning goal for use of the hypertext. When students were asked to create their own text representation without the benefit of a content map of the hypertext, those without the map created more detailed text representations. The researchers concluded the content map of hypertext was not necessary for the reader to have a thorough understanding of the hypertext. For an inexperienced reader of hypertext, it’s likely that navigational tools could impact a reader’s comprehension. Conclusions about the impact of navigational tools do not appear to have been applied to today’s experienced Internet users. Practice and experience may remove some of the hindrances caused by navigational tools. In any case, “navigation of a hypertext requires a goal, a plan to achieve that goal, and the ability to evaluate intermediate results and to revise the plan accordingly” (Rouet & Tricot, 1996). The students in this study had a goal in mind as they created a storyboard that displays each link and how it relates to their group’s web page.
Web Page Design

Many studies have explored ways to use technology as a tool in the classroom. Current research on new technologies often addresses applying new views of traditional literacy acquisition rather than on the aspects unique to multiliteracies (Leu, 2002). There is a scant amount of either qualitative or quantitative research on web site development in the elementary grades. The majority of the combined technology studies on the elementary school level examine the integration of software programs in various subject areas, drill and practice, and keyboarding skills.

Research needs to move beyond the practical use of technology and examine the way students interact with the new literacies and new technologies that are emerging. Textbooks, resource materials, and articles have been published on how to build a web page and what elements should be included. However, the literacy processes and experiences that students are involved in when designing a web page have not been studied. Current studies in educational technology that research any form of web site design are on the middle or high school (Loh & Williams, 2002; Maring, Wiseman, & Myers, 1997; Maslin & Nelson, 2002; Scarcella & Modica, 1998) and pre-service teacher level (Benson & Bruce, 2001; Bento & Bento, 2000; Tanner & Hood, 1997). Most of these studies examine web-based instruction or navigating the World Wide Web and do not adequately address the role of literacy.

Bento and Bento (2000) discuss how college faculty and students with limited or basic technology skills can use the web to support classroom learning. They explore using the web to access materials and resources to support the learning environment. They also discuss using web forums, such as chat rooms and discussion boards, to
promote out of class interaction. Another way to support classroom learning at the college level is to share documents that have been created using familiar software like Microsoft Word or Power Point. Their overall goal was to show how the web can be used daily as a classroom tool.

Scarcella and Modica (1998) inform educators about the important issues and considerations involved in publishing on the web. They describe the basic equipment needed to create a web page as well as the design and execution process. Tanner and Hood (1997) provide music educators with benefits, tips and guidelines for building a school web site. They include the advantages of having a school and teacher web page, give advice for starting the process of creating one, and provide HTML code for a hypothetical web page.

Benson and Bruce (2001) conducted a study involving the process of developing “the inquiry page, a cross-instructional and interdisciplinary web site” (p. 153). This study used focus groups to examine the developmental process of a collaborative web site as teachers expressed themselves through inquiry and meaning construction. As data emerged it was analyzed and feedback was provided to improve the quality of the website. The researchers found that many of the focus group participants did not use the Internet as a communication tool so future research will focus on finding ways to make the inquiry page appeal to those types of users.

Loh & Williams (2002) conducted a quantitative study with two sixth grade classes that examined the features of web sites that motivated and held students attention under a re-created learning environment. The authors designed a Motivational Analysis Rating Kit (M@RK) using a 4-point Likert-type scale. The categories for analysis were:
engaging, meaningful, organized, enjoyable, and overall perceptions. The students visited three web sites with similar structures for fifteen minutes each. After the fifteen minutes, they each completed part 1 of the M@RK before the entire class moved on to the next site. At the end of the third web site, they completed part 2 of the M@RK and participated in an overall rating of the web sites by raising their hands. Loading time was the most important feature for a web site to be ‘cool’ with content information ranking next. The least important feature was the ability to communicate with the author of the web site. The researchers also provided supplementary qualitative findings that included teacher interviews and observational field notes. However, this study appears to be limited by the re-created/simulated learning environment. It is possible that the students viewed this project as a game and their motivation or what they thought was ‘cool’ may have been influenced by that. Also their peers may have influenced their vote in the overall rating.

Maring, Wiseman, and Myers (1997) researched over 150 pre-service teachers as they created interactive web sites. These sites included content literacy strategies as well as service-learning dimensions. The teaching ideas were posted on the web by categories: “a) traditional units, b) integrated units, c) collaborative research projects, d) service-learning reflective essays, e) literature focus units, and f) theme cycles” (p. 199). The pre-service teachers created the web sites to share information and improve literacy skills.

One study that examines the convergence of literacy and technology is Maslin and Nelson (2002). They designed a multimedia project that included authentic literary activities to keep their middle school students engaged. They integrated literacy and
technology by having their students create READ posters and Reading Web Projects. The student-created posters included their digital photograph as well a book review and recommendation for their peers. The students took information from the posters and literature circle discussions and created an interactive resource guide of Web pages about children’s literature that incorporated the same skills and concepts used when creating the READ poster. The students were able to critic the READ posters using a rubric and complete a student evaluation. This project used technology as a tool and allowed students to integrate that technology within the context of literacy and authentic outcomes. Even though this study is on the middle school level, it is pertinent to this study due to literacy and technology integration within an authentic experience.

As is reflected by this section, research on web page design deals with the practical use of the web by providing step-by-step instructions or navigational tips. Research on elementary student’s web page design as well as the multiliteracies that accompany it is an underdeveloped area and needs to be examined further.

**Authentic Assessment & its Relationship to Technology**

As teachers integrate various technologies into the curriculum, they must plan how the technology will be used, consider why it will be used, and how it will improve classroom instruction (Gardiner, 2001; Leider, 1998). For technology to be a beneficial educational tool, teachers must consider the students’ needs and determine what advantages technology will have on learning the presented material (Jacobs, 1996; Sanders, 1999).

Assessment is a fundamental component of education. Teachers assess by collecting and analyzing information to determine their students’ abilities. Farmer (1997)
suggests that assessment “enables one to determine whether students get it,” (p. 11).

Authentic assessment is directly linked to an outcome that is associated with a real-world experience. It is ongoing and provides students with the opportunity to complete a task, self-reflect on that task, receive teacher feedback, and modify the task, if necessary. Maslin and Nelson’s (2002) study provided students with the opportunity to create literacy products using technology as a tool. Students used a teacher created rubric to conduct peer and self-evaluations on each of the READ posters. One limitation of this study is that the teacher created the rubrics. If students had been allowed to create the rubrics that were used, it would have aided in the authenticity of the project.

There is not a prescription to describe an authentic assessment. It can have many forms. McTighe & Ferrara (1994) categorize authentic assessment as product, performance, or process. A product can be something students hand into the teacher like a report, multimedia project, videotape or poem. A performance can range from a debate to an athletic competition. A process is looking at how and what happened through a teacher-student conference or a journal. These categories allow students to be accountable for their learning as they reflect on their prior knowledge and explain the process of acquiring new knowledge. Authentic assessment also allows for students to display their talents and creativity as well as demonstrate their ability to work with others to solve problems.

Jacobs (1996) studied several technology-based projects and found the following themes were common among successful programs: a) the teachers understood innovation was important in the implementation process, b) the roles of the teacher and the students reflected facilitation and self-discovery, c) all areas of the curriculum were integrated, d)
the audience was clearly defined, and e) assessment of learning was valid and reliable. Jacobs (1996) suggests that “technology has the potential to increase the effectiveness and efficiency of curriculum development and delivery” (p. 12). As teachers create curriculum materials for their classroom that incorporate technology, the evaluation and assessment must be authentic and linked to student achievement.

**Rubrics**

Rubrics have been defined in a variety of ways throughout educational literature (Goosrich, 1997; Herman, Aschbacher, & Winters, 1992; Jackson & Larkin, 2002; Montgomery, 2000; Pate, Homestead, & McGinnis, 1993; Wenzlass, Fager, & Coleman, 1999), although many definitions have similarities. A rubric is a guideline or scale that provides the criteria of how a product will be assessed. Scores and descriptions are provided that indicate “gradations of quality from high to low. Depending on the type of rubric used, grades are awarded by the total score only (i.e., holistic) or by separate pieces being judged and then totaled into a final score (i.e., analytical)” (Jackson & Larkin, 2002, p. 40). The criteria is predetermined so students are aware of ‘what counts (Clauson, 1998; Goodrich, 1997; Montgomery, 2000) as their assignment is graded. Nitko (2001) suggests that teachers share the designed rubric with their students so learning aims can be clarified prior to the completion of the assignment.

Goodrich (1997) believes that teachers should use rubrics to assess their students because they help define the quality of the work and allow students to judge that quality. Rubrics also reduce the amount of time teachers spend assessing assignments because expectations are clear for each assignment prior to turning it in. They also allow for differing ability levels that are represented in a heterogeneous class because of their
‘accordion’ nature. Allowing students to create the rubrics that will be used in the class will help them meet the expectations of the project even more since they had a hand in the development of it.

Standards & Their Relationship to Technology

With the infusion of technology use within the classroom, learning environments have been transformed. These new learning environments are student-centered, collaborative, inquiry-based and authentic. Traditional educational practices are not adequately addressing the necessary skills students need to “survive economically in the global workplace” (Thomas & Knezek, 2002, p. 16). School and community leaders believe that it is crucial, in this digital age, for students to be equipped with the necessary resources and skills required for a technological society. Because of this, national and state standards have been developed. The International Society for Technology in Education has created the National Educational Technology Standards (NETS) Project that includes technology standards for students, classroom teachers, and administrators. The standards and their performance indicators detail what each student, classroom teacher, and administrator should know and be able to do with technology. Because this study is concerned with elementary students, only the six national educational technology standards for students that will facilitate the learning of a variety of technology skills in the classroom for all students PreK-12 will be addressed. These technology standards and indicators can be found in Appendix A.

The International Reading Association’s (1991) position statement also reflects the need for students to acquire technology skills.

IRA “believes that much can be done to support students in developing the new literacies that will be required in their future. We believe that students have the
right to: teachers who are skilled in the effective use of information and 
communication technologies (ICT) for teaching and learning, a literacy 
curriculum that integrates the new literacies of ICT into instructional programs, 
instruction that develops the critical literacies essential to effective information 
use, assessment practices in literacy that include reading on the Internet and 
writing using word-processing software, opportunities to learn safe and 
responsible use of information and communication technologies, and equal access 
to ICT (p. 2).

With the support from the international level of reading and technology educators, soon 
all classrooms will be required to reflect such standards. This will change the way 
educators view learning, technology, and the constantly emerging new literacies.

Summary

In summary, research studies have not examined web page development and the 
literacy events that occur in elementary classrooms. A study that provides data about 
web page design in an elementary setting and its relationship to literacy will contribute to 
the growing body of knowledge on literacy and technology. Such a study requires a 
methodology that captures the learning experiences of using technology as a tool for 
learning and examines the possibilities of new literacy events as web pages are created.
CHAPTER III

Method

The purpose of this study was to describe and interpret the literacy events that occurred when students worked in groups to create a group web page as evidence of learning the academic content that was presented within a fourth grade classroom. This study determined and examined patterns that emerged across each group and provided a rich context of understanding for those patterns. A qualitative research design was employed to address the following research questions: What literacy events, new/traditional, occur as 4th grade students work in groups to create web pages and how did these literacy events differ from one another?

Research Design

Qualitative Research

A qualitative research design using a case study approach was employed to collect naturalistic, descriptive data from one elementary classroom. Qualitative research allowed the researcher to study the participants in their own environment. Although the participants were in their own classroom environment, the researcher set the context for this study by designing the multimedia project and providing technology training. Because this study was not attempting to generalize from a situation but to explore the depth, detail and uniqueness of it, a case study method was used to further the qualitative design (Patton, 2002; Merriam, 1998; Yin, 2003). Marshall and Rossman (1989) discuss
the different purposes for case study research – “to chronicle events; to render, depict, or characterize to instruct; and to try out, prove, or test” (p. 44). While each group created a web page, events were observed and accounted for and explanations were provided (Miles & Huberman, 1994). Due to the uniqueness of this study, this approach allowed the researcher to explore, describe, and explain an unknown occurrence (MacNealy, 1998).

Within this case study approach (Patton, 2002; Merriam, 1998; Yin, 2003), a double layer focus group (Stewart & Shamdasani, 1990) was employed to add depth and provide useful information about the specific literacy events that occurred when students worked in groups to create a class web page as evidence of learning the academic content. The first layer of the focus groups involved observations and semi-structured interviews with each of the groups of students in their entirety. This layer provided the researcher with general information about the topic, stimulated new ideas for the researcher and the students, generated impressions of the activities, and diagnosed any problems that the groups encountered (Morgan, 1997; Stewart & Shamdasani, 1990). The second layer was developed in concert with the dissertation committee chair using focus group interviews, general classroom observations, audio taped discussions, along with the themes that emerged after the participants requested to complete an individual web page after the group web page was completed. Using this compilation of sources, the second layer focused on the intricate details of individual members of each group.

Since the focus of this year-long case study was a group of learners in a fourth grade classroom, literacy events have been identified as either in-class literacy events or home literacy events. Although the case study was conducted for the entire school year,
the intervention was bounded during a five-week period during the spring of 2003, in which twenty-seven students from one classroom were engaged in the development of a web page. The intervention was characterized as a ‘bounded’ case because it had a defined chronological, social and physical boundary (Stake, 1995).

Participants

The participants in this study were one general education classroom teacher and her twenty-seven fourth grade students from a suburban elementary school in the southern United States. The overall demographics of this school were 60% White, 17% Black, 11% Hispanic, 7% Asian, 1% American Indian, and 4% multi-cultural, and a total of 869 students (Clark Elementary School, 2001). The participants in the classroom were distributed almost equally by gender and representatively distributed by ethnicity to reflect the school’s demographics.

The participants were reading on levels ranging from beginning third to middle seventh grade, based upon measures used by the general education teacher. At the beginning of each nine weeks the general education teacher performed a Developmental Reading Assessment (DRA) (Beaver, 2003) and The STAR Reader software results (Renaissance Learning, 2003) were also used to determine the reading level of challenge as well as students’ zone of proximal development (Vygotsky, 1978). Additionally, the teacher monitored the participants’ book selections, conducted general observations during academic assignments, and held individual conferences with each participant.

Through an informal conversation between the researcher and the participants, it was ascertained that the technology levels of the participants were minimal. All students were familiar with the software program HyperStudio 3.0 as well the educational games
Math Blaster and Word Munchers from the computer lab during the previous school year. However, Internet searches and opportunities to complete multimedia projects in school were non-existent. In addition, only 20% of the participants had computers in their homes with Internet access.

Pedagogical Context

The pedagogical context for this study took place during the regular education science class period and the weekly assigned computer lab sessions. The general education classroom teacher provided daily academic instruction based on a state mandated science theme, following the Grade Level Expectations for the Sunshine State Standards (Florida Department of Education, n.d.). The fourth grade science expectation that the participants worked on was ‘How Living Things Interact with Their Environment.’ The two standards within that expectation were “1) The student understands the competitive, interdependent, cyclic nature of living things in the environment and 2) The student understands the consequences of using limited natural resources” (Florida Department of Education, n.d.). These science expectations were the basis for the information the students put on the group web pages.

Prior to this study, the general education teacher arranged the participants’ desks in groups of five. These groups, known as ‘base groups’, were long term, heterogeneous, mixed ability level groups (Johnson & Johnson, 2001; Johnson, Johnson & Holubec, 1991; Johnson, Johnson & Smith, 1991). The participants’ behavioral issues and personalities were considered when selecting each group. The participants were accustomed to working together to complete academic tasks so their interpersonal relationship skills had been established. “The purposes of the ‘base group’ were to give
support, help, encouragement, and assistance each member needed to make academic progress and develop cognitively and socially healthy ways” (Johnson & Johnson, 2001, p. 1019). If students have a positive relationship among group members, then they will be more likely to “commit effort to achieve educational goals, listen to and be influenced by their classmates, commit to each other’s learning and success, and achieve and produce” (Johnson & Johnson, 2001, p. 1024). Because these base groups were part of the participants’ natural classroom environment, this arrangement was kept intact for this study.

Since the goals of base groups parallel the goals of the multimedia project, the general education teacher and the researcher reached a consensus concerning the use of the jigsaw cooperative learning technique (Aronson, 2000) for this study. This technique was chosen because the participants were familiar with it from previous classroom assignments. This technique allowed the researcher to obtain descriptive talk of exactly what was happening as the participants worked together in groups. The jigsaw technique required the entire class to be separated into groups of five. After the teacher selected the unit to be studied, the groups were then assigned various topics from the unit. Each participant was responsible for researching a portion of the topic individually and then reporting back to their group at a later date.

This technique encouraged group members to participate with each other as well as allowed members to locate information from various sources (e.g., textbooks, internet, library, and/or peers). This technique also encouraged “listening, engagement, and empathy by giving each member of the group an essential part to play in the academic activity. Group members must work together as a team to accomplish a common goal.
The ‘cooperation by design’ facilitates interaction among all students in the class, leading them to value each other as contributors to their common task” (Aronson, 2000, ¶5).

The project for each group was on the common topic of living things from the larger class theme of life science. The groups determined what important information needed to be taught to the rest of the class following the general education teacher’s requirements and a ‘holistic rubric’ (Nitko, 2001) (Appendix B). This information was compiled and a multimedia project, a group web page, was developed. Prior to this intervention, the researcher created a rubric (Appendix C) to be used, however, after the study was in progress and the participants examined other web pages, they worked with the researcher to create a holistic class rubric (Appendix B) that included features that they felt were important. The students felt comfortable re-designing the rubric because after each technology activity the researcher would ask the students to reflect on the successes and struggles they experienced and modifications were made based on those comments. If there were any unresolved issues, they would be addressed during the next computer lab session. The participants’ opinions were valued and helped shape the design of future activities. This holistic class rubric was used as a scoring tool for the web page. The criteria for the web page included content, required elements, and spelling and grammar. The required elements consisted of completion of the entire storyboard (Appendix D). Once the multimedia project was completed, the classroom teacher totaled the score for a grade (Clauson, 1998; Goodrich, 1997; Jackson & Larkin, 2002; Montgomery, 2000). Each group presented its website to the class and peer feedback and evaluations were given using the holistic class rubric (Appendix B).
The hardware and software used by the participants was housed in the school’s computer lab as well as the general education classroom. The Apple/Macintosh computer lab was where the majority of the technology portion of the project implementation occurred. This lab was equipped with thirty-two Macintosh PowerMac G3s, with Internet access. This lab was where the participants worked individually and within groups to complete their multimedia project. The content information that was displayed on the group’s web pages was typed into the word processing software ClarisWorks using a skeleton model of HyperText Markup Language (HTML) code (Appendix E). HTML allowed the participants to turn the compiled group text and graphics into a web page. The school district did not allow the students to post their websites individually. However, the HTML code was saved to a disc and the researcher emailed them to the school’s web-master. The web-master posted the HTML code weekly so changes could be made if needed. Minimal editing occurred due to the fact that the students carefully typed and checked their spelling as they entered the text for their website. Students also used HyperStudio 3.0 to determine how the background and text color would look once it was posted.

Researcher

As an observing participant, I served as a technology coach, designed the technology assignments, provided technology training to the students, as well as assisted in the implementation of the development of each web page. As a participant observer, I was able to provide a detailed description of the literacy events that occurred when students worked in groups to create their web pages.
I am a former public elementary school teacher as well as a middle school technology coordinator. I am currently a doctoral candidate pursuing a degree in curriculum and instruction with an emphasis in reading and language arts. My stance as participant-observer and observing participant (Patton, 2002) allowed me to focus on the literacy events that took place in this classroom as I ensured that each student had the technological skills necessary to complete the assignment. Due to this immersion in the classroom environment for the entire school year, an open discussion with the study participants was possible and a more intensive analysis of the participant interactions and the many factors that influenced their behavior were observed and documented (Bissex & Bullock, 1987; Morgan, 1997). As with all qualitative research studies, the researcher’s presence in the classroom had some type of impact on the participants. However, a prior relationship was formed with the participants throughout the entire school year because I was a volunteer in the computer lab at the school site.

Table 1 Pre-Intervention Technology Activity Time-Line

<table>
<thead>
<tr>
<th>Week</th>
<th>Technology Activity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week 1</td>
<td>First Visit – General Observations</td>
</tr>
<tr>
<td>Week 2</td>
<td>Weather Internet Searches (Appendix G)</td>
</tr>
<tr>
<td>Week 3</td>
<td>Continue Weather Hyperstudio Stack - Created Computer Lab Help System</td>
</tr>
<tr>
<td>Week 4</td>
<td>Continue Weather Hyperstudio Stack</td>
</tr>
<tr>
<td>Week 5</td>
<td>Completed Weather Hyperstudio Stack</td>
</tr>
<tr>
<td>Week 6</td>
<td>Solar System Internet Search (Appendix F)</td>
</tr>
<tr>
<td>Week 7</td>
<td>Continue Solar System Internet Search</td>
</tr>
<tr>
<td>Week 8</td>
<td>Complete Solar System Internet Search</td>
</tr>
<tr>
<td>Week 9</td>
<td>FCAT Explorer Math Practice</td>
</tr>
<tr>
<td>Week 10</td>
<td>FCAT Explorer Math Practice</td>
</tr>
<tr>
<td>Week 11</td>
<td>FCAT Explorer Math Practice</td>
</tr>
<tr>
<td>Week 12</td>
<td>Complete Flight Seek-n-Find</td>
</tr>
<tr>
<td>Week 12</td>
<td>Complete The Wright Brothers Search (Appendix H)</td>
</tr>
<tr>
<td>Week 13</td>
<td>Complete Women in Flight Cyberhunt (Appendix J)</td>
</tr>
<tr>
<td>Week 14</td>
<td>Complete Create-A-Poem (Appendix I)</td>
</tr>
<tr>
<td>Week 15</td>
<td>Complete Rate a Website (Appendix M)</td>
</tr>
<tr>
<td>Week 16</td>
<td>Complete Mammals Internet Search (Appendix O)</td>
</tr>
<tr>
<td>Week 17</td>
<td>Complete Endangered Species Internet Search (Appendix P)</td>
</tr>
</tbody>
</table>
Pre-Intervention Involvement

The general education teacher and I had established a relationship over the past three years. We were both students in the same university and had taken several courses together. Also, we had both taught in the same large metropolitan public school system in general education classes for seven years. Prior to this study, we had been communicating with each other about how to integrate technology into the existing activities being taught in a fourth grade classroom. In April 2002, I assisted the general education teacher in writing a school-wide grant that was awarded by the school district in August 2002, that dealt with literacy, service learning, and technology. This relationship led me to volunteer to assist the teacher with technology integration into the science curriculum.

In the past, the assigned technology lab time had been used to learn about HyperStudio 3.0, a multimedia authoring tool, and did not reflect specific classroom content. Concerned with state standards, the general education teacher met with the technology lab teacher and asked for permission to bring me in to help with technology integration. The technology lab teacher welcomed me and gave me free reign during the computer lab class to use the time as I saw fit. For the entire 2002 – 2003 academic school year (September 13, 2002 to May 28, 2003), I served as a technology coach every Friday in the computer lab from 1:30 P.M. – 2:00 P.M. The general education teacher and I communicated by e-mail, telephone, and in-person about the topics of study that needed to be addressed weekly. After our discussions, I designed technology activities to be completed within the thirty-minute computer lab class. Students were given a
technology folder to keep all their papers from the computer lab. The students decorated the folders and they were housed in a box in the general education classroom.

The students took their knowledge of HyperStudio 3.0 and created stacks on the topics of the solar system (Appendix F), weather (Appendix G), flight (Appendix H), and self-esteem (Appendix I). I also created technology activities in the form of cyber hunts (Appendix J), a scavenger hunt on the web. These activities incorporated technology training on:

- The basic operations and concepts of the computer
- The use of technology to collaborate and interact with peers
- The use of technology to process data and report results
- The use of the Internet to locate, evaluate and collect information from a variety of sources.

Throughout the school year, I had become a part of the classroom community, serving as a technology coach. The students were very receptive to my assistance as I fostered problem solving and answered general technology questions. I created a classroom management/help system for the computer lab so students did not have to yell out or get out of their seats if they needed assistance. Students placed a half red, half green cylinder on top of their computer. Everyone started on green and when he/she needed assistance the cylinder was flipped over to red. As I circled the room, I watched for ‘a red’ and went over to that student to assist them. As time progressed, the student’s neighbor also made attempts to help the student who was on red. This method encouraged a buddy system that allowed the students to help one another. Our interaction developed into a trusting relationship where students are not afraid to ask for
help. When I saw them on Fridays, they shared classroom and personal events with me that I missed during the week. Once data collection began, I was in the classroom daily and the students became accustomed to my presence. This relationship added to the richness of the data as I documented the interplay between us (Bogdan & Biklen, 2003). My active involvement with them allowed me to address the ‘participants’ perspectives’ (Erickson, 1986) of what has happened in the classroom.

Procedures

The researcher described the purpose and procedures of the intervention to the selected fourth grade class. After this explanation, the participants took a parental consent form home attached to the general education teacher’s weekly newsletter and obtained their parents’ permission. The general education teacher also included a paragraph about the study in the newsletter. This study did not require the creation of special activities: the focus was on the groups completing assigned material for this class. The assigned computer lab time was used to create the 6 groups’ web pages from the research that was collected on the assigned topics. The following steps were used to create a web page:

1. Teacher assigned group research topics for study (non-human mammal, mammal, reptile, fish, amphibian, bird).
2. Students listed their top three choices on a sheet of notebook paper.
3. Teacher and researcher sorted and created groups from students’ choices.
4. Groups decided what part of the topic they planned to research using the jigsaw technique.
5. Participants selected a pseudonym to be used for this study.

7. Researcher conducted the first layer of Focus Group Interviews (Appendix L).

8. Students searched for information on their topic during assigned computer lab, science class, library, and homework time.

9. Researcher reviewed storyboard elements.

10. Groups designed and completed a storyboard (Appendix D).

11. Class & researcher created a Web Page Rubric (Appendix B).

12. Groups created the web page using the storyboard following the skeleton model of HTML code (Appendix E).

13. Emailed web master all the saved HTML code.

14. Web master posted the web pages.

15. Researcher photocopied all of the participants’ science papers (Appendices N-U).

16. Students designed their individual web page storyboards using the researched individual critter information.

17. Researcher conducted second layer of Focus Group Interviews (Appendix L).

18. Web master posted the web pages.

19. Teacher and groups critiqued the six web pages using the Web Page Rubric (Appendix B).

Data Collection

Data collection began on May 1, 2003. Through informal conversations, it was ascertained that none of the participants had ever created a web page. A skeleton model (Appendix E) was used as a guide of how to create a web page. Participants’ selected graphics, links, text and background colors as part of the web page design. They viewed
various websites and reflected on how easy or difficult the site was to read and/or locate information by rating the website (Appendix M). The general education classroom teacher collected tape recorders from the media center and several classroom teachers to be used throughout the study. The researcher provided audiotapes, microphones, and batteries for each tape recorder and the general education teacher assigned a ‘communication captain’ to handle the operational mechanics (Table 2). The ‘communication captain’ inserted audio tapes, turned the tape recorders on and off, and labeled (Table 3) the tapes with the group topic, class session, date and absent group members. Student artifacts (Appendices N – U) from class sessions were photocopied. Researcher field notes were taken daily and the researcher wrote in a reflective journal after each class session.

Table 2 Communication Captain Tape Recorder Directions

<table>
<thead>
<tr>
<th>Communication Captain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tape Recorder Directions</td>
</tr>
<tr>
<td>• Put tape in recorder</td>
</tr>
<tr>
<td>• Press RECORD before your group starts (red light)</td>
</tr>
<tr>
<td>• Press STOP when your group is finished</td>
</tr>
<tr>
<td>• Take tape out of tape recorder</td>
</tr>
<tr>
<td>• Label each tape (list absent students)</td>
</tr>
<tr>
<td>• Give it to Ms. Williams</td>
</tr>
<tr>
<td>• Make sure the red light is OFF at the end of each session</td>
</tr>
</tbody>
</table>

Table 3 Audio Tape Label

| GROUP TOPIC: |
| DATE: |
| SCIENCE or COMPUTER LAB |
| ABSENT: |
Data Sources

The researcher was a fully immersed participant observer (Bogdan & Biklen, 2003) and data was collected (Appendix V) in a variety of ways to obtain a picture, as comprehensive as possible, of the literacy events that occurred while students worked in groups to create web pages. This data included: (1) transcriptions of audio taped group sessions, (2) email correspondence between the general education teacher and the researcher, (3) transcriptions of audio taped focus group interviews, (4) observational field notes, (5) researcher’s reflective journal, and (6) student artifacts (Appendices C, D, F- K, M-U).

Computer Lab Sessions

Five scheduled computer lab sessions took place from 1:30 P.M. to 2:00 P.M. every Friday during the class’s scheduled computer lab time. Three additional computer lab sessions were added at the end of the school year to allow more time to complete the multimedia project. Participants completed additional research using the classroom computer, computers in the school’s media center and computers in their home. Each group session was audio taped using a realistic boundary microphone.

Science Class Sessions

Students participated in the jigsaw technique during twenty-one science class sessions taking place from 12:00 P.M. to 1:00 P.M. daily during the students’ scheduled science class block. Information searches took place during assigned class time as well as through assigned homework. Participants completed additional research using their science textbook as well as in texts available in the school’s media center. Each group
session was audio taped using a realistic boundary microphone and the researcher took observational field notes.

_E-mail Correspondence_

All e-mail correspondence between the researcher and the general education teacher was printed and used to help with the planning and implementation of the technology integration. The email correspondence between the web master and the researcher was also printed for record keeping purposes.

_Focus Group Interviews_

After the science topic groups were chosen, the first layer of the double layer focus groups was established. All interviews were conducted in a teacher workroom, located across the hall from the classroom. During the first layer of the focus group, the researcher conducted a ten-minute audio taped semi-structured focus group interview (Seidman, 1998) with the six groups immediately after the groups met to determine how the groups implemented the jigsaw technique. The researcher created semi-structured interview questions (Appendix L) that allowed the participants an opportunity to verbalize their thoughts and actions. General questions were asked throughout each of the group interviews but some groups elaborated more than others.

As information was collected and the storyboards were designed, the participants were observed and an additional semi-structured focus group interview was conducted to explore what each group was creating. During the development of the web page, the participants were observed and the second layer of the focus group was implemented. Each group member was interviewed individually to obtain a detailed account of the web page creation process.
Since September 12, 2002, the researcher had been volunteering as a technology coach at the elementary school where this study was conducted. After each computer lab visit, thoughts from that day were kept in a reflective journal. Comments were written prior to leaving the school grounds while the researcher sat in her car. The researcher continuously wrote in this journal until the end of the study to include a more personal account of the day’s events. Data collected in reflective journal format during the study was utilized in the analysis. This journal allowed the researcher to elaborate on mistakes made, personal feelings, attitudes, and emotions while in the field as well as record any subjectivity (Bogdan & Bicklen, 2003).

**Student Artifacts**

Throughout the assigned learning tasks, participants completed a group research guide (Appendix K) and designed a storyboard (Appendix D) with their researched information. The entire class worked with the researcher to create a rubric (Appendix B) to ensure their multimedia project would fit the designed criteria of the storyboard. All the papers that the participants accumulated during science and computer lab class sessions were photocopied (Appendices F-J & M-U).

To aid the researcher in triangulating the data, multiple sources were collected, which led to a fuller understanding of the emerging patterns of literacy events (Bogdan & Bicklen, 2003; Denzin & Lincoln, 1994). With the combination of transcribed audiotapes, student artifacts, focus group interviews, and the researcher’s reflective journal, data analysis was informed by a broader understanding of the patterns that emerged.
Data Analysis

This case study was guided by theory and had an emerging naturalistic design. Due to this emergent design, analysis categories emerged from the data instead of being imposed from the beginning. Because this case study included six groups, the data was analyzed using the constant comparative method of data analysis (Patton, 2002; Strauss & Corbin, 1998; Glaser & Strauss, 1967). To analyze the data, the data were coded. Then a narrative describing the data and their analyses were written. In accordance with the constant comparative method, the transcripts of the interviews and group sessions were read first to become familiar with their content. Emerging concepts were noted on these transcripts, next to the text that suggested them. From these concepts, categories were labeled and codes were developed to manage the different concepts and categories. On two occasions, to ensure the quality of the analysis, it was discussed with content expert debriefers, who were knowledgeable in the areas of technology, literacy, and/or research methodology. The debriefing activities focused on exploring meanings, confirming emerging themes, and clarifying interpretations. The debriefers acted as auditors, who examined the process, the data, categories, interpretations, and conclusions to attest that they were internally coherent. A member check was also done with the general education teacher. This was done consistently by reviewing transcripts as they were produced. The member checks provided opportunities to verify emerging themes, correct errors of interpretation on the part of the researcher, and to aid in the triangulation of the data.

As the research design emerged, the researcher analyzed the data using various methods of analysis (Appendix V). Seidman’s (1998) guidelines for interview analysis,
Patton’s (2002) advice for content analysis, and Miles and Hubberman’s (1994) suggestions on pattern coding were used as the categories emerged. Seidman (1998) suggests that all interviews be conducted before studying the transcripts to avoid “imposing meaning” (p. 96) from one group to the next so information can emerge from the transcriptions as they “speak for themselves” (p. 100). Patton (2002) advises researchers to review field notes and interview transcripts and make notes in the margins to organize the data into concepts. As these concepts were made, categories were labeled, and codes were developed to manage the different concepts and categories. Miles & Hubberman (1994) explain that coded data illustrates a pattern that is labeled and easily retrieved.

Summary of Research Study Characteristics

This study was guided by research questions interested in describing and interpreting the patterns of literacy events that occurred as groups of students developed a web page: What literacy events occur as 4th grade students work in groups to create web pages and how did these literacy events differ from one another? To respond to these questions, a bounded case study, which included a double layer focus group, was designed to collect, interpret, and analyze data from one, fourth grade classroom. This case study provided qualitative data on the literacy events that elementary students experienced while creating a group web page during a science class. This description intends to shed light on the process of creating a group multimedia project.
CHAPTER IV

Results

This chapter contains a case study description of one fourth grade classroom comprised of six double-layered focus groups. This chapter also reports the results of the analysis of data collected to examine the new and/or traditional literacy events outside of the reading curriculum that were observed during a science group assignment to create a multimedia project. As data were analyzed, the patterns, themes, and categories of literacy events emerged and will be reported.

The six focus groups were considered within the context of the classroom community that the researcher interacted with for the entire school year. This qualitative inquiry was designed to investigate two broad questions dealing with literacy events, classroom talk, group work, and science and technology tasks:

- What literacy events, new/traditional, occurred as 4th grade students worked in groups to create web pages?
- How did these new/traditional literacy events differ from one another?

The research questions guided the collection and analysis of data as reported in the case study descriptions and researcher’s interpretations. Knowledge gleaned from a case study is concrete because this methodology gives the researcher opportunity to create a detailed analysis and description of a single instance, phenomenon, or social unit (Merriam, 1988). The case study description has been organized around various
identified contexts (Stake, 1995) useful in creating the right balance of description and interpretation integrated into an informative and interesting narrative (Merriam, 1988). Following is a list of the case study contexts (Stake, 1995) used to describe the focus groups.

- An entry vignette describing the researcher’s initial encounter with the participants.
- Summary of previous Internet experiences based on computer lab observations, fieldnotes, and researcher’s reflective journal.
- Descriptive data focusing on information provided by the classroom teacher as well as the researcher’s insights through observations, fieldnotes, and researcher’s reflective journal.
- Introduction to the interview including any unique features of the interview setting.
- Descriptive details of observations as noted by the researcher through careful examination of the transcripts and field notes. Anecdotes and direct quotes from fieldnotes are included to support the observations and interpretations.

The qualitative data results were written in narrative form to paint a complete picture of the descriptive data details representing each focus group, its interview, and the researcher’s observations and insights (Bogdan & Biklen, 2003).

Participants & the Site

The participants involved in this study were one general education classroom teacher and her twenty-seven fourth grade students from a suburban elementary school in the southern United States. The participants in the classroom were equally distributed by
gender and ethnicity to reflect the school’s demographics. The classroom demographics were 44% White, 30% Black, 11% Hispanic, 7% Asian, 4% American Indian, and 4% multi-cultural, and a total of 27 students, 13 females and 14 males. The classroom teacher and the students were addressed by pseudonyms to help ensure confidentiality. The terms ‘participants’ and ‘students’ will be used interchangeably throughout this document because being a fully immersed participant observer in this study enabled the researcher to form a bond with these students and the term ‘participants’ seems too impersonal when the relationship became very personal. The participants will be referred to by their self-selected pseudonyms so that their voices can be heard and their perspectives accurately captured (Bogdan & Biklen, 2003).

The bond that was formed is reflected in a binder that was given to the researcher by the students during the final days of the study. The students invited the researcher to their end of the year class party and presented her with a binder entitled ‘Letters to Mrs. Williams.’ In this binder was a personally designed Chordata Academy flag that was done as an extension activity during a science lesson (Appendix R). On the back of each flag was a handwritten letter from each student. As the researcher read the letters, it became evident that Don’s letter had not been included:

Researcher: “I don’t see one from you.”

Don: “It should be there. (He took the binder and searched through it). I don’t know why it isn’t in there. I’ll make you another one.”

Researcher: “I would appreciate it. I want to have a memory of you that I can hold in my hand.” (Fieldnotes, May 27, 2003)
During the classroom party, Don created a new flag with the following words written in his letter:

“Thank you for coming in this class. You picked the great class. Thank you for helping me when I am stuck. You take your time to look for pictures for our project. Without you I don’t really know where I would be in my project. I really needed your help and you help me. You will make a great teacher. If you ever become a teacher those kids are lucky to have a teacher like you, A teacher like you comes one’s in a live time. You are a great teacher. From, Don Santiago” (Student Artifact, May 27, 2003).

This bond was shaped with the assistance of the general education teacher. She welcomed the researcher into her classroom as an equal body of knowledge that was there to assist the students in their educational process.

Mrs. G, the general education classroom teacher, corresponded by e-mail as well as participated in face-to-face daily conferencing with the researcher throughout this study to ensure that the technology standards were being addressed during the integration of science, literacy, and technology. Mrs. G allowed the students to select their first three choices for science groups by writing them on a sheet of paper (Fieldnotes, May 2, 2003). The group choices were reptile, fish, amphibian, bird, non-human mammal, and human mammal. The students were then divided into groups by their first or second choice. As the researcher and the classroom teacher determined the final groups, behavior issues were considered above first choice selection. No students were absent on the day of group choice selection.

The fish, non-human mammal, and human mammal groups had four participants in each group. The reptile, bird, and amphibian groups had five participants in each group. The racial and gender demographics were random as a result of the selection process. The participants were asked why they selected the group they were in and
answers ranged from wanting to learn more about it to no reason at all (see Table 4).

Allowing the students to select their group gave them the opportunity to become stakeholders in the learning process as well as ensure their full participation throughout the study. After the group web page was underway several group members suggested that they make individual web pages as well. After discussing this with the dissertation committee chair and all the participants, this new technology task developed. Table 4 displays all of the selection categories that were stated as reasons for choosing their group and individual topic.

<table>
<thead>
<tr>
<th>Table 4 Reasons for Group &amp; Topic Choices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wanted to learn more about the topic/new topic</td>
</tr>
<tr>
<td>Interesting/Cool topic</td>
</tr>
<tr>
<td>Checked the wrong box on my paper</td>
</tr>
<tr>
<td>My friend picked the same group</td>
</tr>
<tr>
<td>Used to have a pet</td>
</tr>
<tr>
<td>Other groups too crowded</td>
</tr>
<tr>
<td>Liked the topic/Favorite topic</td>
</tr>
<tr>
<td>TV personality</td>
</tr>
<tr>
<td>No reason</td>
</tr>
</tbody>
</table>

Initial Encounter Vignette

“Today I went to visit Cloud Elementary for the first time. It is large and gray and it reminds me of my high school. I signed in at the front office and someone asked me if I needed help. They have a lot of parent volunteers so they usually just go where they are supposed to go. The lady told me that Mrs. G was in room 329 and to exit through the back door. I walked in the classroom and the students looked at me. They were doing a lesson on ‘Interpreting a Weather Map.’ I observed for a while and Mrs. G introduced me to her class as Ms. Williams. They waved and I waved. The class performed their weather rap. It was very creative. There were 2 beat carriers beating on homemade drums. Three boys were in the middle of the circle being the chorus. They need work! The students were friendly. Once the students finished their raps, Mrs. G asked them to return to their seats. She explained to the students that I was here to help them with their computer skills and that I chose this class out of all the classes in the county. She made me out to be some technology guru and that they were so fortunate to have me helping them. The students thanked me profusely for coming to their school and picking their class. They seemed very excited and grateful for my presence.

We walked to the computer lab at 1:30 PM. Mrs. G introduced me to Mr. Harris, the computer lab teacher, and I sat quietly and observed what they were doing. The students typed in the word ‘LAB’ as the username and left the password line blank. They
clicked on HyperStudio 3.1 but three students had to move because their computers 
would not open the program. Once the program began, Mr. Harris sat at his desk and told 
the students what to do. The assignment was to make six new cards, add a button (with 
no extras), type their name and their teacher’s name, and to choose and add a color 
background and a picture. He said that they would be doing this activity for six weeks. 
The students were not listening to the directions and were talking among themselves. 
They need a help system because many students were lost and not following along. Mr. 
Harris got up and turned on the projector that was connected to one of the student’s 
computers and showed them how to lasso and box a photo from clip art to add to their 
card. Then the 30 minutes were up. I walked back to class with the students and talked 
with Mrs. G about creating stacks about Weather since they were covering that in 
science. The students seemed knowledgeable about HyperStudio and they are willing to 
learn. I can’t wait to connect their classroom learning with the computer lab time” 
(Researcher’s Reflective Journal, September 13, 2002).

This initial encounter with the participants in the computer lab setting allowed the 
researcher to see the stance of Mr. Harris’s pedagogical paradigm.

Summary of Internet Experiences

Informal conversations with the participants informed the researcher that Internet 
experiences were sparse. Only 20% of the students in the class had computers with 
Internet access at home (Researcher’s Reflective Journal, September 20, 2002). The rest 
of the students used the computer at school whenever they were in the computer lab, 
media center, or classroom. The classroom and media center computers were generally 
used to take Accelerated Reader (Renaissance Learning, 2003) tests. Internet searches in 
the computer lab were done rarely because Mr. Harris usually assigned HyperStudio 
projects. After the initial encounter with the class, the researcher discussed with Mrs. G 
the possibility of integrating the science curriculum with the HyperStudio stacks 
(Researcher’s Reflective Journal, September 20, 2002). Mr. Harris was receptive to the 
idea and agreed to provide assistance as I created activities that used the Internet as a tool 
for instruction.
The next week, Mr. Harris showed the class how to get onto the Internet using www.Yahooligans.com. The school board allotted limited Internet access to elementary schools so many sites from other search engines were not accessible to the students. Additionally, photos that participants found on the Internet could not be saved onto the computer because of additional restrictions (Researcher Reflective Journal, September 20, 2002). The students were not familiar with the process of searching the Internet. However, after clear directions were given, as well as many opportunities for practice, they were able to follow directions for searching and maneuvering around various websites with ease (Researcher Reflective Journal, October 4, 2002; November 1, 2002; November 8, 2002; November 15, 2002; December 13, 2002). These opportunities for practice were coupled with questioning and reflection. While the students completed the technology activities, the researcher would monitor their progress. After each task was complete, questioning on the successes and struggles were reflected upon through grand conversations. Suggestions made by the students were taken into consideration after each discussion.

Once the students typed the URL www.Yahooligans.com, Mr. Harris told them to begin their search by typing the word ‘science’ then explained how to narrow the search using the key word ‘weather.’ Mr. Harris explained to the students that using the Yahooligans search engine would ensure that the information the students found was on a “kid’s reading level” (Fieldnotes, September 27, 2002). This search engine was colorful, included graphics, and had a limited amount of text on each page. The participants felt that they could read the information on the Yahooligans website which was evidenced by the following comments:
Researcher: “When you were searching the website did you come to words you weren’t sure of or you weren’t familiar with?”

Zen: “Not really.”

Researcher: “No, you were able to read all of it?”

Zen: “Yeah” (Focus Group Interview, May 21, 2003)

Researcher: “When you were researching tigers did you come across any words you didn’t know?”

Paul: “No, I pretty much knew all the words.” (Focus Group Interview, May 20, 2003)

Researcher: “Did you come across any words that you didn’t know or you weren’t familiar with?”

Rena: “Um Um. I knew all of them.” (Focus Group Interview, May 21, 2003)

Kim stated that she came across two words that she did know:

Researcher: “Did you come to any words you didn’t know when you were doing your research on the Internet?”

Kim: “Yeah”

Researcher: “What did you do when you came to those words?”

Kim: “It was only one. This one! (pointing to Britain) I don’t know where it is or how to say it but I know it is a place.”

Researcher: “Oh Britain, yes, it is in England, very good. So you figured that out

Kim: And that one (pointing to Picus Virdis). Sandy showed me a site that said the word for you but mine didn’t.”
Researcher: “Oh the scientific name. So when you came to those words did you try to figure them out?”

Kim: “I figured them out at home. I looked them up.” (Focus Group Interview, May 21, 2003)

Researcher: “Did you come to any words you didn’t know when you were doing your research?”

John: “Venomous”

Researcher: “Oh, venomous, how did you figure out what it meant?”

John: “I used the glossary of words on the website.”

Researcher: “That was a good way to find out.”

John: “Yeah, it pronounced it for me and everything. I clicked a speaker looking picture and it said the word.” (Focus Group Interview, May 20, 2003)

Descriptive Data of Classroom

The fourth grade classroom where this study was conducted represented a diverse community of learners. Students from various cultural and linguistic backgrounds made contributions to the classroom environment as they influenced each other’s learning (Cambourne & Turbill, 1987; Wells & Chang-Wells, 1992). The participants were reading on levels ranging from beginning third to middle seventh grade. At the beginning of each nine weeks, Mrs. G performed a Developmental Reading Assessment (DRA) (Beaver, 2003) and collected results from the STAR Reader software (Renaissance Learning, 2003) to determine the reading level of challenge as well as the students’ zones of proximal development (Vygotsky, 1978). Additionally, the teacher
monitored the participants’ book selections, conducted general observations during academic assignments, and held individual conferences with each participant.

In the classroom, the desks were arranged in groups of six and each group decided what their team name would be at the beginning to the school year. The teacher hung the team names from the ceiling to foster the social setting and provide opportunities for the groups to encourage and motivate each other. This classroom community was set up as a collaborative learning environment where students were encouraged to work together to problem solve. The classroom was filled with bright colorful bulletin boards displaying various student projects and papers. Centers located in different areas of the classroom included a computer center, library center, art center, author’s chair, drama center, and music center. The sink area housed two gerbils, Clarence and Cloe. The students had various jobs within the classroom that rotated weekly. Students were accustomed to the routines and procedures set up by the teacher, and they were very excited about learning, which caused them to be talkative. However, the talk was productive, and they followed the classroom rules:

Amy: “Cool, where did you find that?”

Ray: “Type in this web address (pointing to address bar).”

Amy: “Ms. Williams said that you have to type it in exactly or it won’t come up.”

(Computer lab fieldnotes, October 4, 2002)

Sam: “Look at this page, it might help you finish your assignment.”

Kate: “I am not sure if I am where you are.”

Sam: “It is ok, the answers are in this section, use your book”

Kate: “Oh, ok. I’ll look there.” (Science class fieldnotes, May 1, 2003)
John: “How did you get your string to stay on?”

Al: “I asked Zen to help me.”

John: “Zen, Can you show me?”

Zen: “I think I can remember how to do it, let me see it.” (Science class fieldnotes, May 1, 2003)

This classroom community was rooted in the social constructivist theories of learning that assume learners actively construct their own understandings within social contexts (Brooks & Brooks, 1999; Duffy & Cunningham, 2001; Spivey, 1997; Vygotsky, 1978).

Interview Setting

The researcher conducted each of the double-layer focus group interviews in a teacher workroom located across the hall from Mrs. G’s classroom. The participants were very excited about being allowed to enter into this room because normally students were not allowed to be there. None of the participants had ever been in the teacher workroom before and were aware that they were not allowed to enter the room, which is reflected in the following dialogue:

Researcher: “Why are you peeking in the door? Come in.”

Matt: “Cause kids aren’t supposed to be in this room. It says no students (on the door)”

Researcher: “Students aren’t allowed but you guys get special treatment. Mrs. G said it was ok for us to be here.” (Focus Group Interview, May 21, 2003)

The teacher workroom was carpeted and set up with cabinets all around the walls. There were sets of math and science textbooks on two bookshelves and props from a 4th grade play along the back wall. A telephone and a microwave rested on the far corner of the
cabinets. A teacher restroom was located next to the entrance of the room. There was a table in the middle of the room where the interviews were conducted. The researcher used a battery operated audio tape recorder because the table was not close enough to an outlet for the adapter to reach.

As each focus group entered the teacher workroom the following dialogue took place:

Researcher: “Tell me the name of your group.”

Group (in unison): “Group name”

Researcher: “What made you pick this group (group name)?”

Group: (individually) “Answers (see Table 4)”

Researcher: “How did you decide what to do for your part of the jigsaw?”

This dialogue was the standard introduction of the first layer of the focus group interview. As the groups collected information for their topic, they decided to pick a ‘critter’ that they found interesting and to collect more information related to their topic as they designed their own individual web page. The term ‘critter’ was used by Mrs. G to describe whatever the individual topic was that they chose within the group. The second interview addressed their group topic as well as their individual topics and the following dialogue occurred:

Researcher: “What is your group topic?”

Donte: “Reptiles”

Researcher: “What ‘critter’ did you pick to research?”

Donte: “Anaconda”

Researcher: “What made you pick that ‘critter’?”
Donte: “Well because it is my favorite snake in the whole wide world.” (May 21, 2003 - second layer of focus group interview)

Researcher: “What is your group topic?”

Al: “Non-humman mammals.”

Researcher: “What ‘critter’ did you pick to research?”

Al: “Black footed ferret.”

Researcher: “What made you pick that ‘critter’?”

Al: “Me and my cousin Ray both like have a ferret named Sho and we really like ferrets.”

(May 21, 2003 - second layer of focus group interview)

Researcher: “What is your group topic?”

Will: “Reptile.”

Researcher: “What ‘critter’ did you pick to research?”

Will: “Rattlesnake.”

Researcher: “What made you pick that ‘critter’?”

Will: “Well um rattlesnakes are kinda interesting to me and because I wanted to learn if it was poisonous.”

(May 20, 2003 - second layer of focus group interview)

The group web pages were comprised of information that the groups collected on their topics as well as a link to another web page that each individual student created with information on their ‘critter’ (Appendix D).
Descriptive Details of Observations

Science Class Sessions

The researcher conducted daily observations and was fully involved in the classroom activities of the science class sessions. The researcher sat at a computer table to view the entire class, also to see the board, during whole group instruction. As individual and group work took place, the researcher would sit at different group tables and interact with the students as well as walk around the room to observe students as they worked. The observations and class assignments were documented in fieldnotes. Frequently students would look at what the researcher was writing. On one occasion, Marla made the comment, “Cool, you did it too!” when the researcher copied a T-chart about vertebrates and invertebrates that Mrs. G created on the board (Fieldnotes, May 8, 2003). The students included the researcher in their conversations as well as asked for help if they were stuck or confused about the assignment as reflected in the following dialogue:

Tina: “What are we supposed to be doing?”

Researcher: “Read the board”

Tina: “Create a puzzle about how animals meet their needs”

Researcher: “Have you selected your animal?”

Tina: “No not yet”

Researcher: “Well that is the first step, then do your puzzle pattern.” (Fieldnotes, May 5, 2003)

The science lessons revolved around the web pages that the groups were making. The overall science theme was animals, and students had to research information on
various topics throughout the study. Students explored how animals met their needs, ‘critter’ facts, vertebrates and invertebrates, and the scientific classification system. The students participated in hands-on and cooperative learning activities. They were able to help each other and frequently asked their neighbors for help:

Lisa: “What in the world do I put under oxygen?”


Joe: “Most amphibians have a life span between 4 and 20 years.”

Brad: “Some amphibians can be poisonous.”

Don: “They go through metamorphosis.”

Jim: “Not all of them!”

Man: “Yeah, yours does! Yours goes through metamorphosis.”

Don: “Mine has to grow a tail then it has to grow legs.”

Brad: “That’s metamorphosis!”

Don: “Yeah, well most have tails! They start with tails?”

Jim: “Tadpoles have tails.”

Don: “Some!”

Joe: “Some amphibians have fur.”

Don: “NO! Salamanders don’t!”

Man: “A lot of them don’t. I don’t know any amphibians that have fur.”

Brad: “I looked on the Internet and it said that one of the salamanders, its tail is fuzzy.”

The students used the different facts about their ‘critter’ to aid in the discussion about the general topic.

*Computer Lab Sessions*

The researcher conducted weekly observations in the computer lab. These observations differed from the science class observations because the researcher constantly circulated around the room and provided the participants with instructions and assistance when needed instead of sitting down and observing. Fieldnotes were documented as the researcher walked around the computer lab and after the sessions took place.

Throughout this study, the participants sat anywhere they chose during the computer lab sessions. However, when the group research began, one student, Sandy, suggested that the groups sit together and the other groups agreed (Fieldnotes, May 15, 2003). As the groups sat together and searched the Internet for information on their topic, group members assisted each other on locating information on the web. For example, Sandy said, “Look at my computer, type this address in and you can find information” (Fieldnotes, May 2, 2003). Mrs. G talked to Mr. Harris about having more computer lab time since the class was working on web pages. Since school was winding down and would be ending within the month, the participants were able to visit the lab twice a week for the last two weeks of the study.

*Literacy Events*

This case study focused on the emerging new literacies that moved beyond reading, writing, and listening skills by using technology as a tool for communicating and gathering information. As the groups designed, planned, and implemented their web
pages, oral, listening, viewing, and written on-task communication and interactions were observed and analyzed and two types of literacy events were determined, in-class and home. As these literacy events emerged, competencies and strategies were used to acquire new knowledge. This occurred through the retrieval and communication process that students participated in while completing science and technology activities. The literacy events that occurred while using text can be seen as traditional. Text includes textbooks, the chalkboard, the Internet, library/classroom resources, and dictionaries/glossaries. The literacy events that are in addition to text-based resources are classified as new. These events encompass the strategies that the students used after they encountered the text and had to modify for one reason or another (see table 5).

<table>
<thead>
<tr>
<th>In-Class Literacy Events</th>
<th>Strategy</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conversation</td>
<td>Whole Class Discussions</td>
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<tr>
<td></td>
<td>Topic Group Discussions</td>
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<tr>
<td></td>
<td>Peer Interactions</td>
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<td></td>
<td>Teacher/Researcher Interactions</td>
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<td></td>
<td>Science/Computer Lab Sessions</td>
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<tr>
<td></td>
<td>Reflection</td>
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<tr>
<td>Integration of Media (N)</td>
<td>Media Influences</td>
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<tr>
<td></td>
<td>Web Pages</td>
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<tr>
<td></td>
<td>Whole Class/Group Discussions</td>
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<tr>
<td></td>
<td>Reflection</td>
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<tr>
<td>Critical Reading</td>
<td>Reading the Board</td>
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<td></td>
<td>Reading the Internet</td>
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<td></td>
<td>Reading Textbooks</td>
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<td></td>
<td>Reading Classroom/Library Resource</td>
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<tr>
<td></td>
<td>Reflection</td>
</tr>
<tr>
<td>Independent Literacy Use</td>
<td>Using the Glossary /Dictionary</td>
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<tr>
<td></td>
<td>Classroom/Library Resources</td>
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<tr>
<td></td>
<td>Library Visits</td>
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<td></td>
<td>Homework Time</td>
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<td></td>
<td>Student Artifacts</td>
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<tr>
<td></td>
<td>Editing &amp; Revising Text</td>
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<tr>
<td></td>
<td>Using the Table of Contents</td>
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<tr>
<td></td>
<td>Skimming/Scanning</td>
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<tr>
<td></td>
<td>Sequencing</td>
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<tr>
<td></td>
<td>Higher Order Problem Solving</td>
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<tr>
<td></td>
<td>Comprehension</td>
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<td></td>
<td>Reflection</td>
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<tr>
<td><strong>Web Pages</strong></td>
<td>Attending to Text Features</td>
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<td></td>
<td>Attending to Bold Print Words</td>
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<tr>
<td></td>
<td>Finding/Locating Resources</td>
</tr>
<tr>
<td></td>
<td>Rewriting Text in Own Words</td>
</tr>
<tr>
<td></td>
<td>Student Artifacts</td>
</tr>
<tr>
<td></td>
<td>Higher Order Problem Solving</td>
</tr>
<tr>
<td></td>
<td>Reflection</td>
</tr>
<tr>
<td><strong>Asking for Assistance/ Questioning</strong></td>
<td>Assistance from Teacher</td>
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<tr>
<td></td>
<td>Assistance from Researcher</td>
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<td></td>
<td>Assistance from Peers</td>
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<td>Assistance from Family</td>
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<td></td>
<td>Assistance from Self</td>
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<tr>
<td><strong>Self-Questioning</strong></td>
<td>Activating Prior Knowledge</td>
</tr>
<tr>
<td><strong>Home Literacy Events</strong></td>
<td>Independent Literacy Use</td>
</tr>
<tr>
<td></td>
<td>Finding/Locating Resources</td>
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<td></td>
<td>Rewriting Text in Own Words</td>
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<td>Media Influences</td>
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<td></td>
<td>Family Modeling</td>
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<tr>
<td></td>
<td>Using the Glossary /Dictionary</td>
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<td>Reflection</td>
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</table>

**New & Traditional In-Class Literacy Events**

Through technology, the participants had the opportunity to access the entire learning community as they constructed knowledge. In-class literacy events were literacy events that took place within the classroom environment as students participated in oral, listening, viewing, or written interactions and were reported through group work, informal conversations, focus group interviews, and observations. These events were shaped by the technology as well as the social interactions that took place within the groups (Lave, 1988; Pea, 1994). As students conducted Internet searches, they had to learn how to put information into their own words and they also became familiar with how to ‘read the web.’ Hypertext allowed the reader to actively manipulate the path used to gather information and construct meaning; however, if that path was obstructed in some way the reader became frustrated. For example, while completing the ‘Rate a
Kim erased her entire paper and then flipped her cylinder to red and yelled, “I need help!”

Researcher: “What’s wrong?”

Kim: “It won’t go!”

Researcher: “What do you mean it won’t go? What won’t go?”

Kim: “It won’t click and go nowhere! (clicking the mouse)” (Fieldnotes, May 2, 2003).

Kim was referring to some text that was underlined on the screen. She kept clicking on the underlined text and it didn’t take her to another page. It wasn’t a link; rather, the web designer had just used underlining as a formatting option. Yet, Kim had learned that underlined words on a web page should take her somewhere. Finally, Kim got it and knew that underlining usually means links.” (Researcher’s Reflective Journal, May 2, 2003). Although reading the text itself is a traditional literacy event, knowing how to manipulate hypertext is new.

As students began researching various websites, they realized that not all information posted on the web is accurate. For example, Don was searching for information on turtles and found different pieces of information on two different websites.

Don: “I did a search for turtles and one website said that it was an amphibian and another website said that it was a reptile.”

Researcher: “So what does that mean?”

Don: “Somebody doesn’t know what they are talking about and I am going to have to look in a book and find out what is what.”
Researchers: “That is a good idea. It is always wise to use different sources of information so you can check your facts.”

Don: “I see!”

Researchers: “You need to let your classmates in on your new revelation.”

Don: “Hey everybody, you better watch out what you find on the Internet because I just read that a turtle is an amphibian and a reptile. You need to check in the library or our science book to make sure you have accurate information before you turn in your assignment to Mrs. G.” (Fieldnotes, May 9, 2003 – completing Appendix N)

Thus the lesson of being a critical reader was learned first hand by encountering misinformation. Conducting research and compiling information from various text-based sources is a traditional literacy event. However, collecting information from the Internet and ensuring its accuracy is a new literacy event.

An instance also occurred where a student just copied from the website and did not put the information into their own words. The issue of plagiarism represents the lack of transfer between strategies and knowledge owned and used in traditional literacy events verses new literacy events. Mrs. G addressed this issue with entire class:

 Mrs. G: “Just like when you do research in books, you don’t copy word for word, when you read the Internet you don’t copy word for word either. When I grade your assignment, I will know if these are your fourth grade words or somebody’s twelfth grade words.”

Marla: (walking up to the researcher) “I didn’t know you couldn’t do that. I’ll fix it.”
Researcher: “OK. Make sure you put it into your own words.”

Marla: “I will.” (Fieldnotes, May 15, 2003)

Most participants were aware that the Internet text needed to be rewritten in their own words, unfortunately, Marla did not make that connection.

When students worked in groups throughout the study, they assisted each other and gave support to other members, as they participated in higher-order problem solving to complete the science and technology tasks. For example,

Researcher: “What are you guys doing?”

Jim: “My computer froze but Don is on the same website I was trying to get to so he said that I could look on his computer.”

Researcher: “Thank you for being good problem solvers.” (Computer lab fieldnotes, May 2, 2003)

Mrs. G: “Take the cards and classify them however your group wants as long as you can justify your classification.”

(Kevin, Will, and Amy were struggling)

Marla: “Look at the clues on the front of the card to help you. That’s what our group did.”

Kevin: “Oh, the pictures.”

Marla: “Yeah. We looked at them to help us.” (Fieldnotes, May 12, 2003 – lesson on scientific classification system)

Zen: “Are birds cold-blooded?”

Man: “I don’t know.”
Researcher: “Maybe someone in the bird group can answer that question for you?”

Zen: “Hey Lisa, are birds cold blooded?”

Lisa: “No, they are warm blooded and they have feathers.”

Rena: “They have beaks too.”

Dee: “They also hatch from eggs.”

Zen & Man: “Thanks! You guys told us everything.” (Fieldnotes, May 14, 2003 - lesson on Chordata Academy Appendix R)

As the students reviewed other web pages prior to designing their own, they were searching for ideas from other web pages.

Researcher: “Now look around today when you are searching the web and look to see if there are different colors on the sites. See if they are hard or easy to read. Try to decide what colors you want to use as you are planning your storyboard.”

Don: “Can’t you delete it if you don’t like it?”

Researcher: “Yes.”

Mark: “If you go into HyperStudio then you can test your colors.”

Researcher: “That is a good idea.” (Fieldnotes, May 8, 2003)

Mark’s suggestion helped his classmates alleviate unnecessary revising once their web page was posted.

*New & Traditional Home Literacy Events*

Home literacy events also came into play as students located information on their group topics and individual ‘critters.’ Home literacy events were literacy events that took place at home pertaining to the assigned science/technology tasks. The student, through
informal conversations, group work, or focus group interviews, reported the home literacy event, so it was not witnessed by the researcher.

Factors such as television media and sibling modeling played a role in the literacy home events.

Researcher: “What group did you pick?”

Georgia: “Reptiles”

Researcher: “What made you pick the reptile group?”

Georgia: “Well I watch a person named the Crocodile Hunter and he’s my favorite person that’s on TV and he likes reptiles and I am interested in snakes and lizards.”

Researcher: “Wow! You got interested in reptiles from watching the Crocodile Hunter. So what made you pick the crocodile?”

Georgia: “Because sometimes I am interested and I write down some of the facts about the crocodile and what he says about them and that is my favorite reptile.”

(May 21, 2003 – second layer of focus group interview)

Researcher: “Where did you find your research?”

Joe: “Sometimes on Yahoo and then on Google.”

Researcher: “Oh, Google too? While you were in class?”

Joe: “It wouldn’t let me bring up all the websites at school but there was this little card that I couldn’t read all the stuff on it because we ran out of time.”

Researcher: “How did you know to search on Yahoo and Google?”
Joe: “Well cause everyday my brother goes on Google and every time he goes on there it always comes up. And there is everything so I just thought it might have it on there.”

Researcher: “Oh cool! Sometimes when we are in the lab we get locked out and we can’t look at all the cool stuff you can see from your home computer. You have the Internet at home and you can explore different things.”

Joe: “Yeah and we have two computers.” (May 20, 2003 – second layer of focus group interview)

Lack of assistance at home also emerged as an event but it did not hinder the learning task. As evidence by Marla’s encounter in and out of school.

Marla: “Ms. Williams, I brought my paper back today, written in my own words.”

Researcher: “Oh, you did! I thought you were going to do it today during lab time.”

Marla: “I thought I had to do it for homework.”

Researcher: “No you didn’t but I am glad you did. I am very proud of you for taking the initiative.” (Fieldnotes & Researcher’s Reflective Journal, May 16, 2003)

Researcher: “When you first started doing your research, you just copied off the Internet and then you went home and put it in your own words.”

Marla: “Yeah.”

Researcher: “You did a really good job once you took it home. I am very proud of you!”
Marla: “What I did when I put it in my own words was I took some words out and sometimes I made them a little easier because the other one when I didn’t do it right it took up the whole page and you didn’t want it to do that (laughter).”

Researcher: “Well it can fill up the whole page but it has to be in little fourth grade words not big twelfth grade words right?”

Marla: “Right.”

Researcher: “I am very proud of you and I am pleased. I didn’t think that you were going to take it home and change it. I thought you were going to change it while we were in class. So I was really happy when you showed it to me the next day and told me that you took it home and changed it.”

Marla: “I thought you were supposed to do that. So that is why I did it.”

Researcher: “Well it was very studious of you. Did you get help from anyone at home?”

Marla: “No, I did it by myself. Nobody was home with me to help me.” (May 20, 2003 – second layer of focus group interview)

Although Marla did not receive any help from someone at home, she participated in a home literacy event by taking her copied information and changing it into her own words at a location other than school. Brad and Kim also found information on their own from an outside of school source.

Researcher: “Did you get all of your information from the Internet or did you use other sources like books or classroom resources like those cards or fact sheets?”

Brad: “When I went home, I got some information. Like the poison arrow frog cannot be eaten by nobody.”
Researcher: “No one can eat him?”

Brad: “Nope, nobody because everything in their body is poisonous.”

Researcher: “Wow! Where did you find that information at home?”

Brad: “I went up to the library on my bike the other night and I found a poison arrow frog book.”

Researcher: “So that was a good resource of information then?”

Brad: “Yes!” (May 21, 2003 – second layer of focus group interview)

Researcher: “Did you try to figure it out?”

Kim: “I figured them out at home.”

Researcher: “Oh at home.”

Kim: “I had wrote them on a paper.’

Researcher: “So who helped you when you got home?”

Kim: “No one.”

Researcher: “No one. You didn’t get any help from anyone.”

Kim: “I didn’t ask for none, I looked them up in the dictionary.” (May 20, 2003 – second layer of focus group interview)

These home literacy events took place outside of the school environment but were vital to the retrieval of information for the web pages (see Table 5).

**Communication**

The Merriam-Webster Online Dictionary (2003) defines communication as “a process by which information is exchanged between individuals through a common system of symbols, signs, or behaviors” (¶1). The communication between the students in this class continually influenced their learning as they compared situations and shared...
knowledge with their classmates (O’Keefe, 1995). Mrs. G used role-playing as a way for students to communicate with each other about the subject matter:

Mrs. G: “What you are going to do is make eye contact with somebody at a different table than you. One of you is going to walk over to the other person that you are looking at. For example, let’s say that Dee makes eye contact with Zen now either Dee can walk over to Zen’s table or Zen can walk over to Dee’s table and you are going to pretend like you are two critters that meet at the zoo. Say, hi I am … and then you are going to tell your partner how you meet your needs. Please visit someone that is not at your table because you are working on different group topics and you can teach each other about the particular critter you are studying.” (Fieldnotes, May 7, 2003)

The science and technology tasks that the students participated in required conversation to achieve a goal. The group members were able to problem solve as they discussed the planning, designing, and implementation of the multimedia project. The group discussions allowed students to connect their personal experiences as they activated their prior knowledge of the subject matter. For example, during a science lesson, the human-mammal group brainstormed what they already knew about themselves.

Monica: “What do we already know about our topic? I know that you check your pulse for 15 seconds and you can times it by four. You can also do your pulse for a minute and add a zero at the end. And that your heart is nonstop everyday, it never takes a break.”
Marissa: “Your ribs protect your heart and if you didn’t have bones or a skeleton that keep you steady you’d fall.”

Sandy: “We have ears and other body parts.”

Marla: “We swallow our food and chew it.” (Fieldnotes, May 13, 2003 – completing Appendix K)

**Retrieval**

As students completed their multimedia project, they were required to retrieve information from various sources while “sharing and exchanging strategies” (Leu, 2002) within literacy events. Retrieval can be seen as the process of getting, bringing back, or recovering information (Merriam-Webster Online, 2003). The information that was retrieved stemmed from whole class discussions, group sessions, prior background knowledge, Internet and library searches, classroom resources, as well as peer and adult interactions.

Donte: “Our group knows that snakes, alligators, and crocs are reptiles.”

Will: “They shed their skin and their environment is in trees, on land, and in water.”

Mark: “Some of them hatch from eggs.”

Casey: ‘What will we do to find information about our topic?’

Georgia: “We can look it up in a reptile book.”

Donte: “Go on the Internet and explore.”

Mark: “Ask the teacher.” (Fieldnotes, May 13, 2003 – completing Appendix K)

Researcher: (coming in the classroom late handing me his paper) “What took you so long, where were you?”
Donte: “I was in the lab, I needed to finish my paper.”

Researcher: “Did you get it all finished?”

Donte: “I was still there when everybody left the lab and I asked Mr. Harris for help. He said that I could stay and he showed me some sites to help me finish my paper.” (Fieldnotes, October 8, 2002)

*Intertwined Communication & Retrieval Processes*

The in-class and home literacy events that emerged throughout this study represent how students utilized different strategies to communicate and retrieve the new knowledge that was acquired as they researched their topics. Students used multiliteracies as these events emerged. These multiliteracies reflect using the computer as a tool to communicate and gather information (Leu, 2002; Reinking, 1998). As the students developed communication and retrieval strategies to assist in acquiring new knowledge within the new literacies, these strategies intertwined with each other. This intertwining can be seen as Zen helps classmates during a computer lab session:

Zen: “I have all my facts together I just need to select my link and my colors.”

Researcher: “Ok, will you help your classmates if they need it?”

Zen: “Yes.”

Mr. Harris: “If you really want to get some information on animals you really need to look up the country where the animal is from and then type in the animal’s name. Yesterday someone was trying to find a toucan and they were calling it a condor bird. There isn’t a condor bird.”

Dee: (*whispering to Zen*) “Yes it is, because I have it as my critter.”

Zen: “Did you find the fact card about it in the classroom?”
Dee: “Yeah but I can’t find it on the web.”
Zen: “Type it in the search box. Are you spelling it right?”
Dee: “I think so, c-o-n-d-o-r.”
Zen: “Do you remember where it lives?”
Dee: “California, that’s why I picked it.”
Zen: “Ok, then search for California then birds. That should help you.”
Dee: “Something came up, thanks.” (Fieldnotes, May 7, 2003)

This dialogue reflects the intricacies of communication and retrieval throughout the interactions of participants.

Strategies

As students communicated and retrieved information, they employed strategies that helped them complete their assigned science and technology tasks. As the patterns and themes of literacy events emerged, the categories were developed and strategies were determined (see table 5). These strategies were determined as the researcher analyzed and coded the data sources. The content area debriefers conferred with the researcher that these categories and strategies were pertinent to the study. The participants intentionally used these strategies to communicate and retrieve information as they designed and planned the web pages. These strategies are intertwined with each other as students fluctuate back and forth as they communicate and retrieve. Communication was part of the retrieval process and retrieval was part of the communication process because each learner was a sender and receiver of information as he/she interacted with one another.
Summary of Research Results

This case study examined the patterns of emerging new and/or traditional literacy events as students created their group and individual web pages. The literacy events that emerged throughout this study were in-class and home literacy events. These literacy events were part of the oral, listening, viewing, and written on task communication and interactions that took place as students designed, planned, and implemented their web pages. The in-class literacy events took place within the classroom environment; however, the home-literacy events took place outside of the school. As the participants engaged in science and technology tasks, they acquired new knowledge by utilizing different retrieval and communication strategies.
Chapter V

Conclusions

The purpose of this study was to describe the literacy events that occurred when students worked in groups to create web pages as evidence of learning the academic content [e.g. theme, strand, or topic of study] that was presented within a fourth grade classroom. Interpreting the literacy events as students created web pages shows how the Internet supports reading and writing in the elementary classroom when it is utilized as a tool for promoting instruction. The research questions for this study were as follows:

1) What literacy events, new/traditional, occurred as 4th grade students worked in groups to create web pages?

2) How did these literacy events differ from one another?

This case study involved a constant comparative analysis of six double-layered focus groups (Stewart & Shamdasani, 1990). A constant comparative analysis allowed the researcher to use multi-data sources in which the analysis was ongoing throughout data collection (Strauss & Corbin, 1998; Glaser & Strauss, 1967). This final chapter consists of the following three sections: a summary of findings, their significance within today’s educational settings, and recommendations for further research.
Summary of Findings

*Literacy Events*

The first research question sought to identify the new/traditional literacy events that occurred as students worked in groups to create web pages. During the planning of this study, literacy events were defined as any oral or written on-task communication or interaction, however, as data were collected, listening and viewing became a part of the communication and interaction as well because students used all of the language arts as they completed the multimedia project. The literacy events that involved text (i.e., textbooks, chalkboard, Internet, library/classroom resources, and dictionaries/glossaries) are classified as traditional because they resemble the literacy acts discussed by Guthrie and Greaney (1991) in terms of how they affect the utilization and acquisition of knowledge to fulfill school assignments. However, all literacy events that went beyond the use of text are considered new.

As students participated in in-class or home literacy events, they gathered new information to complete an academic task. These literacy events and the strategies that students used within the science and technology tasks were both new and traditional. These strategies were related in several ways (see Table 5). During both in-class and home literacy events, students acquired new information through retrieval and communication. Both types of events required the participants to obtain accurate information for their multimedia project. Various resources were used, such as the Internet, textbooks, and library books. Technology changed the way students gathered information by having access to instant, unlimited sources of information. This access influenced the way students read and it placed importance on critical reading. They did
not view the Internet information in the same way as traditional text information, so
accurate information and plagiarism was an issue that had to be addressed when using
Internet sources. Researching various topics in traditional print based texts, such as
books, was familiar to the participants in this study; however, Internet research was
foreign to them. The transfer from one print medium to another was not made.

Participants read traditional text and hypertext in many of the same ways. Within
both traditional text and hypertext, students attended to the text features. Bolded text was
seen as important text and the glossary and table of contents were also used as sources of
additional information. Many of the same reading strategies were used in reading both
types of texts. However in traditional texts, students used skimming and scanning as a
strategy to gather information and while reading the Internet, they read all of the text on
the screen and often requested to print the information instead of reading it from the
computer monitor. Because the text on the Yahooligans website was condensed, the
students were unable to quickly scan or skim the text and decipher the important
information. The Yahooligans website “is a searchable directory of Internet sites for kids.
Each site has been carefully checked by an experienced educator to ensure the content
and links are appropriate for kids aged 7-12” (Yahooligans, 2003). Reading the Internet
required the skill of navigating, which occurs simultaneously with comprehension as
students decide where to go next on the screen.

Finding and locating resources was another strategy that was used in both traditional
and hypertext, however when hypertext was used, students navigated the text and were
able to search in various places and different web sites by clicking on links. In the
traditional text, sequencing followed the structure of the text and using the table of contents was the only way to search for information out of sequence in the book.

The participants in this study were involved in a constructivist-learning environment in which they were able to make choices about their topics and plan their web pages. This gave the students autonomy, which provided them with an authentic experience and allowed them to bring in prior knowledge as well as be the ‘keeper’ of new knowledge that they attained. This sense of ownership, allowed the students to create a new rubric that met their needs as well as add an individual web page component. Prior to this study, the use of technology was a set of isolated events not related to the academic tasks in the classroom. However, the multimedia project that was completed integrated science, literacy, and technology. Technology allowed the students to communicate their ideas and access information. The students were able to use an interdisciplinary approach to planning and designing their assignment. Their excitement for learning highlighted the outcomes needed for authentic assessment: “true to life and reflecting lifelong skills” (Farmer, p. 11).

The second research question focused on the differences between these literacy events. The in-class and home literacy events differed due to the location of where the tasks took places. The key components that separate the home and in-class literacy events were peer and adult interactions and Internet access. During in-class literacy events, students were able to work with their class community to acquire new knowledge, through interactions with others. Discussion was vital to the in-class literacy events, whether done in groups or one-on-one. The science and technology tasks supported and contributed to the students’ abilities to make decisions, choices and be actively involved
in their own learning. The classes’ ‘cooperation by design’ set up allowed the participants to work together in a ‘friendly’ and ‘safe’ environment where they were allowed to take risks. These risks manifested themselves through the authentic academic tasks of creating a class rubric and completing an individual web page.

On the other hand, home-literacy events were tasks that were completed alone with no interaction with others. These events were solitary actions that the participants engaged in outside of the elementary school setting. The students who reported participating in home-literacy events did not interact with anyone while completing their science/technology tasks. They had resources available to them for use at home, such as dictionaries, Internet access, and library books. Only one of the students who reported a home literacy event had Internet access at home. Despite the technological inadequacies within the home, it did not affect the outcome of the multimedia projects because all participants did the majority of their project at the school.

Significance Within Today’s Educational Settings

With the rapid changes in technology and how it is used, our definition of literacy must grow as well. This needed change has been slow to reach the field of literacy research. Educators know very little about how the Internet supports literacy learning in the classroom. There is minimal research pertaining to elementary student web page development, leaving a gap in knowledge of how best to instruct children to be strategic readers and users of this cognitive tool. Technology standards are being eased into the school curriculum and teachers need to be aware of the dynamics, benefits, and challenges of using technology as a tool for learning and instruction. This study seeks to provide classroom teachers with viable alternative measures to assess their students’
acquired knowledge and procedural understandings while participating in an authentic academic task.

This study has implications on the way that educators, administrators, and students view the use of technology in the classroom. Computers are an essential part of our global society, despite the fact that many educators are not effectively using technology as a tool to enhance instruction. Many individual teachers are not ready to transform how they facilitate the learning process by integrating technology into their classroom. The use of technology requires a change in pedagogical practices and with the current emphasis on standardized testing, teachers and administrators may not see where it ‘fits into the curriculum.’ The Internet causes educators to rethink the way they describe text, reading, and literacy.

With the use of the Internet, topics can be researched in a minimal amount of time, in a variety of ways, and found in multiple locations. Allowing technology to ‘fit’ into the curriculum can aid in the overall understanding of the academic tasks assigned to their students. On the basis of the data that was collected and analyzed for this study, the findings indicate that using multimedia projects as a form of assessment ‘fits’ perfectly. The students were involved as a community of learners and assisted each other in the design, planning, and implementation of a web page. The science curriculum and its standards were addressed and much more information was covered through the use of gathering from and posting information to the Internet.

Recommendations for Further Research

Understanding literacy events and their multiliteracies within a technological age requires a deeper analysis of context. Examining the use of technology within literacy
tasks and how elementary students attitudes are changed by those tasks is important for future research. Like all events, “literacy occurs in a milieu” (Guthrie & Greaney, 1991). Whether the literacy events take place in-class or at home, describing what happens while students interact within these events as they use technology is vital to the conceptual framework of constructivism.

Future research can explore website readability. The participants in this study used www.yahooligans.com so their reading levels were not an issue because it is geared toward 7-12 year olds. However, if other search engines had been used that catered to adults, the information that was gathered would have been difficult for them to understand. Vocabulary acquisition would be an important factor of understanding the information on the web.

Another area for exploration is how students navigate the web and what strategies they use within that navigation process. This information would provide educators with basic knowledge of how to teach skills that are needed to ‘read the web.’ Monitoring the browsing and navigational patterns of elementary students may highlight topics such as time on task and researching skills.

Issues of concern contributing to the digital divide are still in need of a solution. There once was an expectation of everyone in America having access and availability to the World Wide Web no matter what their socio-economic status, however, research on patterns of technology access often mirror existing inequalities (Schofield, 1998) and may have worsened rather than solved equity disparities (Serim, 1999). Research studies discerning the way technology can benefit all socio-economic groups needs to be conducted.
Because of the positive experiences that the researcher had when conducting this study, it has become evident how important it is to build a ‘relationship’ with the participants that are being researched. This is an important issue that should be considered prior to researcher’s conducting studies.
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Appendices
Appendix A

National Educational Technology Standards

1) Basic operations and concepts
   - Students demonstrate a sound understanding of the nature and operation of technology systems.
   - Students are proficient in the use of technology.

2) Social, ethical, and human issues
   - Students understand the ethical, cultural and societal issues related to technology.
   - Students practice responsible use of technology systems, information, and software.
   - Students develop positive attitudes toward technology uses that support lifelong learning, collaboration, personal pursuits, and productivity.

3) Technology productivity tools
   - Students use technology tools to enhance learning, increase productivity, and promote creativity.
   - Students use productivity tools to collaborate in constructing technology-enhanced models, preparing publications, and producing other creative works.

4) Technology communications tools
   - Students use telecommunications to collaborate, publish, and interact with peers, experts, and other audiences.
   - Students use a variety of media and formats to communicate information and ideas effectively to multiple audiences.

5) Technology research tools
   - Students use technology to locate, evaluate, and collect information from a variety of sources.
   - Students use technology tools to process data and report results.
   - Students evaluate and select new information resources and technological innovations based on the appropriateness to specific tasks.

6) Technology problem-solving and decision-making tools
   - Students use technology resources for solving problems and making informed decisions.
   - Students employ technology in the development of strategies for solving problems in the real world” (http://cnets.iste.org/students/s_stands.html).
Appendix B

Researcher’s Original Rubric

WEB PAGE RUBRIC

Teacher Name: Mrs. G

Student Name: _______________________________

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>Excellent</th>
<th>Good</th>
<th>Satisfactory</th>
<th>Needs Improvement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning of Material</td>
<td>The student has an exceptional understanding of the material included on the page and where to find additional information. Can easily answer questions about the content and procedures used to make the web page.</td>
<td>The student has a good understanding of the material included on the page. Can easily answer questions about the content and procedures used to make the web page.</td>
<td>The student has a fair understanding of the material included on the page. Can easily answer most questions about the content and procedures used to make the web page.</td>
<td>Student did not appear to learn much from this project. Cannot answer most questions about the content and the procedures used to make the web page.</td>
</tr>
<tr>
<td>Cooperative Work</td>
<td>Partners show respect for one another’s ideas, divide the work fairly, and show a commitment to quality work and support for each other.</td>
<td>Partners show respect for one another’s ideas, divide the work fairly. There is commitment by some members toward quality work and support of one another.</td>
<td>Partners show respect for one another’s ideas, divide the work fairly. There is little evidence of a commitment toward quality work in the group.</td>
<td>Partners argue or are disrespectful of other’s ideas and input. Criticism is not constructive nor is support offered. Mostly one or two people did the work.</td>
</tr>
<tr>
<td>Spelling and Grammar</td>
<td>There are no errors in spelling, punctuation or grammar in the final draft of the web page.</td>
<td>There are 1-3 errors in spelling, punctuation or grammar in the final draft of the web page.</td>
<td>There are 4-5 errors in spelling, punctuation or grammar in the final draft of the web page.</td>
<td>There are more than 5 errors in spelling, punctuation or grammar in the final draft of the web page.</td>
</tr>
</tbody>
</table>

Adapted from www.rubistar.org
WEB PAGE RUBRIC

Name: __________________________________
Group: _________________________________
Critter: __________________________________

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>EXCELLENT</th>
<th>GOOD</th>
<th>SATISFACTORY</th>
<th>NEEDS IMPROVEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Content</td>
<td>All content is in the students’ own words and is accurate.</td>
<td>Almost all content is in the students’ own words and is accurate.</td>
<td>At least half of the content is in the students’ own words and is accurate.</td>
<td>Less than half of the content is in the students’ own words and/or is accurate.</td>
</tr>
<tr>
<td>Required Elements</td>
<td>Storyboard included all required elements as well as a few additional elements.</td>
<td>Storyboard included all required elements and one additional element.</td>
<td>Storyboard included all required elements.</td>
<td>One or more required elements were missing from the storyboard.</td>
</tr>
<tr>
<td>Spelling &amp; Grammar</td>
<td>No spelling or grammatical mistakes on the storyboard with lots of text.</td>
<td>No spelling or grammatical mistakes on the storyboard with little text.</td>
<td>One spelling or grammatical error on the storyboard.</td>
<td>Several spelling and/or grammatical errors on the storyboard.</td>
</tr>
</tbody>
</table>
Appendix D

Storyboard

GROUP TOPIC: ___________________________ Teacher: Mrs. G

Name: ____________________________________________________

Critter or Topic…

Ms. Williams saved my photo to a disc for me!

Write your 5 facts in COMPLETE sentences. NEATLY!
1. ______________________________________________________
2. ______________________________________________________
3. ______________________________________________________
4. ______________________________________________________
5. ______________________________________________________

Place a link to an additional site…

A link will go back to Mrs. G’s homepage
Appendix E

Web Page Skeleton Model

Each group's web page will begin with the following HTML code.

```html
<HTML>
<HEAD>
<TITLE> Group Topic </TITLE>
</HEAD>
<BODY BGCOLOR="#FFFFFF">
SELECT A COLOR:
<CENTER>
<H1>GROUP TOPIC/TITLE </H1>
<IMG SRC="bear.gif" WIDTH=141 HEIGHT=114 ALT="BEARS"> Select a graphic
</CENTER>
<P> All the researched information</P>
<A HREF="Mrs.Gpage.html">Home</A>
</BODY>
</HTML>
```
Appendix F
Solar System Technology Activity

What year was the Hubble Telescope Launched? _________

What is the name of our Galaxy? ______________________

In what year was the first part of the international space station
launched? __________

What did Neil Armstrong say when he took the first step on the
moon?
“_________________________________________________________________
_________________________________________________________________
_________________________________________________________________.”

How long does light from the sun take to reach the earth? _________

On January 28, 1986, the space shuttle ____________ lifted off from
_______________ in Florida carrying _____ astronauts. It blew up
after being in space for only one minute.

Find the answers at:

http://spacelink.msfc.nasa.gov
http://npac.syr.edu/textbook/kidsweb/Sciences/astronomy.html
http://news.bbc.co.uk/cbbcnews/hi/sci_tech/newsid_2712000/2717267.stm
http://hubble.gsfc.nasa.gov/overview
http://www.jpl.nasa.gov/stars_galaxies/stars_galaxies_index.cfm
http://news.bbc.co.uk/cbbnews/hi/sci_tech/newsid_2712000/2701693.stm
Appendix G

Weather Technology Activity

Weather Facts HyperStudio Stack

• Create a new document

• File – Save As (Lab Folder) – Facts – Your Name

• Edit – New Card
  (Make 12 new cards – Title Card, 10 Fact Cards, The End Card)

• Objects – Add a Button
  Add 1 button on your Title card that goes to card two
  Add 2 buttons on card 2-11 that goes to the previous card and
  the next card.
  Add 1 button on The End card that goes to the Title card.

• Select what each button will look like.
  Will it have words, icons, or colors?
Appendix H
Flight Technology Activity

NAME: _____________________________

Directions: Search the websites below to learn about the adventures of the Wright Brothers.

After years of design and scientific progress, Orville and __________ Wright were ready to test their first powered plane named ___________________________. On the morning of December 17, ______, the Wright Brothers reached the sky with their first powered plane. They stood on the beach on Kitty Hawk, _________________________ and flipped a coin to see who fly the plane first. The first flight lasted only ____ seconds and the plane only traveled ______ feet. The Wright Brothers were from ______________________________ and owned a __________ shop.

Find the answers at:

www.psb.org/kcet/chasingthesun/innovators/owwright.html
http://www.nps.gov/wrbr
http://invention.psychology.msstate.edu/i/Wrights/simulation/Wright_sim.html
http://aero-web.org/history/wright/first.htm
www.fi.edu/flights/first/intro.html
Appendix I
Self-Esteem Technology Activity

NAME: _____________________________

Directions: Create an acrostic poem using your first name. Use adjectives that begin with each letter.

(Example: BOB)
B - Brilliant
O - Obedient
B - Bright

Open HyperStudion 3.1 (New Stack)

Design one HyperStudio card (art & words)

*****USE YOUR CREATIVITY*****
NAME: ____________________________________

**DIRECTIONS:** Type in each web address (URL). Locate ONE fact about a woman in flight and write it in the box.

<table>
<thead>
<tr>
<th>WEB ADDRESS (URL)</th>
<th>Woman In Flight Fact</th>
</tr>
</thead>
<tbody>
<tr>
<td><a href="http://www.ninety-nines.org/coleman.html">http://www.ninety-nines.org/coleman.html</a></td>
<td></td>
</tr>
<tr>
<td><a href="http://www.pbs.org/wgbh/amex/flygirls/peopleevents/pandeAMEX01.html">http://www.pbs.org/wgbh/amex/flygirls/peopleevents/pandeAMEX01.html</a></td>
<td></td>
</tr>
<tr>
<td><a href="http://www.pbs.org/wgbh/amex/kids/flight/peopleknow.html">http://www.pbs.org/wgbh/amex/kids/flight/peopleknow.html</a></td>
<td></td>
</tr>
<tr>
<td><a href="http://teacher.scholastic.com/space/sts7/interview.htm">http://teacher.scholastic.com/space/sts7/interview.htm</a></td>
<td></td>
</tr>
<tr>
<td><a href="http://www.pbs.org/wgbh/amex/flygirls/peopleevents/pandeAMEX02.html">http://www.pbs.org/wgbh/amex/flygirls/peopleevents/pandeAMEX02.html</a></td>
<td></td>
</tr>
<tr>
<td><a href="http://www.pbs.org/wgbh/amex/flygirls/peopleevents/pandeAMEX03.html">http://www.pbs.org/wgbh/amex/flygirls/peopleevents/pandeAMEX03.html</a></td>
<td></td>
</tr>
<tr>
<td><a href="http://teacher.scholastic.com/space/mae_jemison/index.htm">http://teacher.scholastic.com/space/mae_jemison/index.htm</a></td>
<td></td>
</tr>
</tbody>
</table>
Appendix K
Group Research Technology Guide

Group Research Guide

NAMES: _________________________________________________________

TOPIC: __________________________________________

What do we already know about our topic that will help us complete our assignment?

What are the questions we want to answer in our research?

What will we do to find the answers?

How will this project be divided among our group?
Appendix L

Focus Group Interview Questions

Interview #1 - Questions

Tell me the name of your group topic?

What made you pick this group?

How did you decide what to do for your part of the jigsaw?

Where did you find your research?

How did you know to look there?

Did anybody in your group or outside of your group help you?

While you were researching, did you come across any words you weren’t familiar with or that you didn’t know? If so, how did you figure out what those words meant?

Is there anything else you want me to know about your project?

Interview #2

What is your group topic?

What ‘critter’ did you pick to research?

What made you pick that ‘critter’?

When you were searching the web did you come to words you didn’t know? IF so, what did you do?

Did anybody in your group or outside of your group help you?

What sources did you use to find information for your website?

Explain to me how you created your storyboard...

Is there anything else you want to tell me about your web page?
Appendix M

Rate a Web Site Technology Activity

Name: _________________________________________

Directions: Go to www.Yahooligans.com and search for web pages on any topic you choose. Review the web page and evaluate it according to the following criteria. Circle the rating that you feel the site deserves, GREAT, OK, or NOT SO HOT.

TIP: Get ideas for how you would like to design your own web page

URL (Web Address): ____________________________________________________

<table>
<thead>
<tr>
<th><strong>Download Speed</strong></th>
<th>Great</th>
<th>OK</th>
<th>Not So Hot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quickly load text</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quickly loads graphics</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Navigation Ease</strong></th>
<th>Great</th>
<th>OK</th>
<th>Not So Hot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Easy movement link to link</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Links are clearly labeled</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Links are helpful</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Appearance</strong></th>
<th>Great</th>
<th>OK</th>
<th>Not So Hot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visually appealing</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Content</strong></th>
<th>Great</th>
<th>OK</th>
<th>Not So Hot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accurate &amp; useful</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Clearly organized</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Worthwhile information</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reading level</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Graphics, Videos, &amp; Sounds</strong></th>
<th>Great</th>
<th>OK</th>
<th>Not So Hot</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphics are relevant to the site</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Graphics enhance content</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

COMMENTS: __________________________________________________________
                                                        __________________________________________________________
                                                        __________________________________________________________
Appendix N

Design A Card Technology Activity

Name: __________________________  Group: __________________________

Directions: Design a card about a critter from your topic. ANY CRITTER. Do a search on www.Yahooligans.com and get information for the card.

Draw a picture of your critter

Fill in the following information:

- Common name
- Scientific name
- Where they live
- What they eat
- Are they endangered? YES NO WHY?

FUN FACT:

Front of card

Back of card
Appendix O

Mammals Technology Activity

NAME: _________________________________

Go to the Internet and type in www.Yahooligans.com. Type mammals in the search box.

List and write information about three (3) mammals.

1) _________________________________
   > Habitat:
   > Size:
   > Diet:

2) _________________________________
   > Habitat:
   > Size:
   > Diet:

3) _________________________________
   > Habitat:
   > Size:
   > Diet:
Appendix P

Endangered Species Technology Activity

Go to [www.Yahooligans.com](http://www.Yahooligans.com) and search for endangered species or extinct species.

Complete the table

<table>
<thead>
<tr>
<th>Species (name)</th>
<th>Classification (example: mammal, bird, reptile, amphibian)</th>
<th>Location (example: Brazilian rain forests)</th>
<th>Habitat (example: forest, ocean, grassland)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Owens pupfish</td>
<td>amphibian</td>
<td>Owens River, CA</td>
<td>river marsh</td>
</tr>
<tr>
<td>Philippine Eagle</td>
<td>bird</td>
<td>Philippines</td>
<td>forest</td>
</tr>
</tbody>
</table>
Appendix Q

Animals Defend Themselves Science Worksheet

### Animals Defend Themselves

Animals must protect themselves from their enemies in order to survive. Six methods of defense are explained below the boxes. Match two animals to each method.

<table>
<thead>
<tr>
<th>Python</th>
<th>Armadillo</th>
<th>Hognose Snake</th>
<th>Treehopper</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="snake.jpg" alt="Python" /></td>
<td><img src="armadillo.jpg" alt="Armadillo" /></td>
<td><img src="snake_eyes.jpg" alt="Hognose Snake" /></td>
<td><img src="treehopper.jpg" alt="Treehopper" /></td>
</tr>
<tr>
<td>I wrap my body around my enemy.</td>
<td>I have bony plates covering my body.</td>
<td>I turn over on my back and stay still.</td>
<td>I look like a thorn on a rosebush.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Honeybee</th>
<th>Lobster</th>
<th>Antelope</th>
<th>Ptarmigan</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="honeybee.jpg" alt="Honeybee" /></td>
<td><img src="lobster.jpg" alt="Lobster" /></td>
<td><img src="antelope.jpg" alt="Antelope" /></td>
<td><img src="ptarmigan.jpg" alt="Ptarmigan" /></td>
</tr>
<tr>
<td>My sting causes pain and swelling.</td>
<td>I crush enemies with my strong claws.</td>
<td>My long legs help me run fast.</td>
<td>I turn snowy white in winter.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bombardier Beetle</th>
<th>Porcupine Fish</th>
<th>Opossum</th>
<th>Sparrow</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="bombardier_beetle.jpg" alt="Bombardier Beetle" /></td>
<td><img src="porcupine_fish.jpg" alt="Porcupine Fish" /></td>
<td><img src="opossum.jpg" alt="Opossum" /></td>
<td><img src="sparrow.jpg" alt="Sparrow" /></td>
</tr>
<tr>
<td>I squirt a hot, irritating gas.</td>
<td>I puff up my spine-covered body.</td>
<td>I close my eyes and go limp.</td>
<td>I fly into thick bushes to hide.</td>
</tr>
</tbody>
</table>

1. **Escape**
   I move fast or hide where enemies can't reach me.

2. **Weapons**
   My body or body parts are designed for fighting.

3. **Armor**
   My special body covering protects me from enemies.

4. **Playing Dead**
   I pretend to be dead when my enemies are near.

5. **Camouflage**
   My color or body shape disguises me from enemies.

6. **Chemicals**
   I use poisons or unpleasant sprays.

**Challenge!** List other animals that protect themselves by each method.

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Appendix R

The Chordata Academy Science Worksheet

Name: ____________________________ Identifying characteristics of vertebrates

The Chordata Academy
It takes a backbone to be a student at the prestigious Chordata Academy! The school's board hires only the finest teachers. Also, headmaster Lionel Kingofbeasts takes great care in preparing class rosters so that students and teachers are perfectly matched. Help Lionel get this year’s rosters ready by completing the list of student qualifications under each teacher’s name (some may be used more than once).

The Chordata Academy
We welcome all vertebrates!
Qualifications:
- warm-blooded
- feed young with milk
- breathe with lungs
- have feathers
- cold-blooded
- most have hair or fur
- live part of life in water, part on land
- live in water
- hatch from eggs
- have scales
- breathe with gills or lungs
- most bear live young
- have a beak or bill
- breathe mainly with gills

Instructor Avog Birdy’s Class
- vertebrate
- ____________________________
- ____________________________
- ____________________________
- ____________________________
- ____________________________
- ____________________________

Professor Reptilia’s Class
- vertebrate
- ____________________________
- ____________________________
- ____________________________
- ____________________________
- ____________________________
- ____________________________

Mr. Mammalia’s Class
- vertebrate
- ____________________________
- ____________________________
- ____________________________
- ____________________________
- ____________________________
- ____________________________

Dr. Amphibia’s Class
- vertebrate
- ____________________________
- ____________________________
- ____________________________
- ____________________________
- ____________________________
- ____________________________

Ms. Four-Fish’s Class
- vertebrate
- ____________________________
- ____________________________
- ____________________________
- ____________________________
- ____________________________
- ____________________________

Bonus Box: Design a school flag for Chordata Academy.

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Note to the teacher: To complete this page, students will need access to science books, encyclopedias, or other reference materials.
Appendix S

Mammal Nursery Science Worksheet

Mammal Nursery

For mammals that give birth to live young, the time during which the baby animal grows before being born is called gestation. Gestation times vary from animal to animal.

Directions: Many baby animals are in the Mammal Nursery below. Below each name is the baby’s gestation period. Notice that some babies—like the rabbit—gestate in about a month, while a mother elephant waits nearly two years for her baby to be born! Have fun visiting the babies. Then use the gestation data to complete the bar graph at the right. (For this activity, one month equals 30 days.)

<table>
<thead>
<tr>
<th>Mammal</th>
<th>Gestation Period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Giraffe</td>
<td>About 400 days</td>
</tr>
<tr>
<td>Rabbit</td>
<td>About one month</td>
</tr>
<tr>
<td>Tiger</td>
<td>About 100 days</td>
</tr>
<tr>
<td>Pig</td>
<td>Four months</td>
</tr>
<tr>
<td>African Lion</td>
<td>About 98 days</td>
</tr>
<tr>
<td>Black Rhinoceros</td>
<td>About 15 months</td>
</tr>
<tr>
<td>African Elephant</td>
<td>About 22 months</td>
</tr>
<tr>
<td>Koala</td>
<td>35 days</td>
</tr>
<tr>
<td>Spotted Hyena</td>
<td>About 110 days</td>
</tr>
<tr>
<td>Vampire Bat</td>
<td>About 200 days</td>
</tr>
</tbody>
</table>

**Bonus Box:** Based on the data above, do any mammals have the same gestation periods? What is the average gestation period of all the mammals (in months)?

Note to the Teacher: If desired, provide students with colored pencils for completing the graph.
Appendix T

How Animals Meet Their Needs Science Puzzle
Appendix U

Zoolapalooza! Science Worksheet

Zoolapalooza!
Planning Guide

(my animal)

Draw a sketch of your animal in the box. Check off each item below as you complete it.

1. Explain how different body parts and characteristics help the animal meet its needs for
   ___ a. food ___ b. water ___ c. shelter ___ d. appropriate body temperature

2. Explain different behaviors that help the animal meet its needs for
   ___ a. food ___ b. water ___ c. shelter ___ d. appropriate body temperature

3. Tell whether the animal is a vertebrate or an invertebrate.
   ___ Vertebrate?
     ___ a. Describe how it breathes.
     ___ b. Explain how it maintains its body temperature.
     ___ c. Describe the animal's body covering.
   ___ Invertebrate?
     ___ a. Describe the animal's body structure.
     ___ b. Explain how it gets and eat its food.
     ___ c. Describe how the animal moves.

Writing
___ 1. Did you write clear, solid sentences?
___ 2. Did you write complete sentences?
___ 3. Did you vary your sentence starters?
___ 4. Did you avoid run-on sentences?
___ 5. Did you capitalize correctly?
___ 6. Did you end every sentence with proper punctuation?
___ 7. Did you check for spelling errors?
## Appendix V
### Procedures & Design Timeline

<table>
<thead>
<tr>
<th>WEEK</th>
<th>Procedures</th>
<th>Data Collection</th>
<th>Analysis</th>
</tr>
</thead>
</table>
| Week 1 | Teacher assigned group research topic  
Students listed top three choices  
Begin observations  
Random groups were formed  
Groups used jigsaw technique  
Participants self selected pseudonym  
Information search & collection  
Completed ‘Group Research Guide’ | Email correspondence  
Observational field notes  
Audio tapes of group work sessions  
Photocopy Appendix K  
Researcher’s reflective journal | Document Analysis  
(Patton, 2002)  
Pattern analysis  
(Miles & Hubberman, 1994)  
Document Analysis  
(Patton, 2002) |
| Week 2 | 1st Layer of ‘Focus Group Interviews’  
Researcher reviewed storyboard elements  
Information search & collection  
On-going classroom observations | Audio taped focus group interviews  
(Appendix L)  
Audio tapes of group work sessions  
Observational field notes  
Email correspondence  
Researcher’s reflective journal | Interview Analysis  
(Seidman, 1998)  
Pattern analysis  
(Miles & Hubberman, 1994)  
Document Analysis  
(Patton, 2002) |
| Week 3 | Information search & collection  
Groups designed & completed ‘Storyboard’  
Created a group web page using skeleton model  
(Appendix E)  
On-going classroom observations  
Emailed web master saved HTML code  
Web master posted the web pages | Audio tapes of group work sessions  
Photocopy Appendix D  
Observational field notes  
Email correspondence  
Researcher’s reflective journal | Document Analysis  
(Patton, 2002) |
| Week 4 | Information search & collection  
Edit, Revise & Critique completed group web pages  
Individuals designed & completed ‘Storyboard’  
Created individual web pages using skeleton model  
(Appendix E)  
On-going classroom observations | Audio tapes of group work sessions  
View web page on the WWW & Teacher and groups used Appendix C to critique the 6 web pages  
Photocopy Appendix D  
Observational field notes | Document Analysis  
(Patton, 2002) |
| Week 5 | Information Search & Collection  
Created individual web pages using skeleton model (Appendix E)  
Photocopied Student Artifacts  
On-going classroom observations | Email correspondence  
Researcher’s reflective journal  
Audio taped focus group interviews (Appendix L) | Interview Analysis (Seidman, 1998) |
|---|---|---|
| | Edit, Revise & Critique completed group web pages | Audio taped group sessions  
Student artifacts  
Observational field notes  
Email correspondence  
Researcher’s reflective journal | Document Analysis (Patton, 2002) |
About the Author

Rewa C. Williams received both her Bachelor’s and Master’s Degrees in Elementary Education from Florida Agricultural & Mechanical University in Tallahassee, Florida. She has taught grades first, second, third, fourth- science & math, sixth, seventh and eighth- technology in the public schools of Florida.

While in the Ph.D. program, Ms. Williams was a program assistant with the InterLink Project, a federally funded grant that focused on literacy, technology and service learning. She has been a graduate teaching assistant as well as the graduate assistant to the Chair of the Childhood Education Department. She furthered her scholarly potential and service as a member of the editorial board for the Florida Reading Quarterly, the secretary for the American Education Research Association’s Vocabulary SIG and by presenting at several international, national and state level conferences. Ms. Williams is currently an assistant professor at Clemson University in Clemson, South Carolina.