Books or Bytes:
Media Format and Literacy Education

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MEDIA FORMAT AND LITERACY EDUCATION

Submitted to the
School of Interdisciplinary Studies
(Western College Program)
in partial fulfillment of
the requirements for the degree of
Bachelor of Philosophy
Interdisciplinary Studies

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Miami University
Oxford, Ohio
2005

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ABSTRACT

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With new media saturating American culture and classrooms, it is particularly important that this media be evaluated before integration into the classroom. Despite public calls for computer utilization in all levels of education, the research does not support the use of computers in teaching emergent literacy skills during early childhood. This project argues that despite the advances in modern technology, children’s picture books enhance literacy in ways that computers cannot.

A thorough understanding of the skills required to achieve literacy is needed to effectively evaluate the usefulness of a medium in literacy instruction. Although many skills are needed to become literate, three widely accepted categories of literacy skills focused on are: print and phonological awareness, comprehension, and social interaction. Children who do not master literacy skills during the early elementary grades are destined to always lack the ability to master literacy and in turn will have more difficulty achieving academic success throughout their educational career.

There is a short window of time during early childhood when students must obtain literacy skills in order to succeed to the best of their abilities academically. To utilize this time most effectively, this project evaluates the media of computers and picture books through analysis of: media evolution in the classroom, the physical format of the media, and an original observational study.

This project further argues that social interaction is a key factor in teaching literacy skills that should not be ignored when choosing a media format for classroom use. Social interaction, especially interaction with an adult, is one of the most important factors in teaching children literacy skills. Even with the advanced technology available in our society today, computers still cannot fully imitate the human interaction needed for effective literacy instruction.
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Introduction
Modern technology has put the world at our fingertips and brought with it a new language filled with dot-coms, emails, and instant messages. Yet as we stepped into the digitized world of the 21st century, did we leave behind the discernment needed to decide when technology is and is not best used? Today stores are filled with ‘educational’ computer software claiming to teach young children emergent literacy skills, yet there is little research demonstrating the effectiveness of such programs. There is however research which demonstrates that picture books can be used as a powerful tool in the literacy curriculum, yet more and more it seems books are being left to collect dust on the shelf while children stare at a computer screen. In a society where print literacy is the foundation of educational and career success, it is vital that we understand and implement the best methods when teaching children to read. In light of this situation, this paper argues that despite the advances in modern technology, children’s picture books enhance literacy in ways that computers cannot.

Today the term literacy has been applied to the knowledge of various media formats. For the purposes of this paper the term literacy will be related only to the capability of deciphering print materials. The achievement of such literacy requires the mastering of print awareness, phonological awareness, and reading comprehension. Furthermore, print literacy is reliant upon the development of language skills and hence to a large extent depends on the amount of social interaction a child is exposed to. Research has shown that there is a window of brain and language development during early childhood when print literacy is best learned, and that once a child passes this window it is difficult to learn or enhance literacy skills. Early elementary educators must
make sure this window of time is utilized in the most effective way so children can attain and enhance their literacy skills to the fullest of their capabilities.

Today many parents believe the sooner their children become computer literate, the better their chances of excelling in school. This belief has caused many school districts to attempt to integrate computers into classrooms. However, there is little research on the benefits of utilizing computers in the early elementary classroom. The benefits of the use of computers in literacy instruction are particularly questionable. There is, however, proof that when children interact with picture books, especially with the aid of an adult, many literacy skills can be enhanced. New technology has attempted to transform the picture book read-aloud through computer software that simulates the read-aloud experience. However, the benefits of transferring the picture book read-aloud to a computer read-aloud remain questionable. Therefore, understanding the media available for use in a literacy curriculum and the benefits and risks associated with media use, is a must for early education teachers and administrators.

In order to evaluate the relative merits of picture books and computers in a literacy curriculum, many factors must be taken into consideration. A comprehension of literacy and the skills required to achieve literacy must be understood. The history of how different technologies have been integrated into educational institutions and the results of these integrations should also be noted. Likewise, the actual physical format of the media and how the format may affect integration and use of the media in an early elementary classroom should be analyzed as well. This interdisciplinary project attempts to take into account all of these factors as it compares the media of computer read-alouds and picture book read-alouds. Through extensive research and an observational study,
this project offers a preliminary answer to the question of whether the use of computers and picture books in the early elementary classroom is an ‘either-or’ situation, or if the utilization of both media may be beneficial in different contexts.
Chapter 1

Teaching Literacy: Evaluating the Media
To assess how the different media of picture book and computer software read-alouds can most effectively be used in literacy instruction, this project considers three well established requirements for literacy development in children: Print/Phonological Awareness, Comprehension, and a nurturing Social Context. These categories are based upon various studies which have supported and highlighted those components considered essential for literacy achievement. It should be noted that these assessment categories are not exhaustive of all components required to obtain literacy, however, they encompass the key components which elucidate the benefits and disadvantages of picture book and computer software read-alouds.

Before a description of these assessment categories is given, the definition of literacy as used throughout this project will be discussed, along with a brief overview of some of the main stages in obtaining literacy as they are currently understood at the cognitive level. This definition and explanation will introduce the theories upon which the rest of this project are based and is included to aid reader understanding of the concepts utilized. Many literacy definitions that have been proposed across different disciplines will not be included in this paper due to length restrictions. Literacy acquisition is a complex process which is achieved in so many different ways that none claim to completely understand the process or argue that one form of instruction is best for all students. The beliefs about literacy and literacy instruction which have been supported with the most experimentally-based evidence and which are endorsed by national literacy and reading instruction organizations are the theories utilized in this paper.
Today our culture is filled with multiple literacies, such as critical literacy, computer literacy, and cultural literacy, yet for the purposes of this project the term literacy will refer only to the ‘ability to read and write with competence’ or ‘print literacy’ (Merriam Webster Online). This form of literacy “includes all the activities involved in speaking, listening, reading, writing, and appreciating both spoken and written language” (Armbruster et al. 59). Literacy in this sense is a complex process which requires the mastery of various physical and cognitive skills. Although research is continuing to reveal more about the process of learning to read, a very simplified description of some of the widely-accepted cognitive steps which must be achieved to become truly literate are outlined below.

To obtain print literacy in reading, one must first learn the process of word recognition or knowing how to decode letters and words on a page in order to draw meaning from them (Nathan and Stanovich 176). Some may argue that one is literate once word recognition is achieved, yet the true goal of literacy is to become a fluent reader who can comprehend and enjoy reading. Reading fluency is the “the ability to read connected text with appropriate speed, accuracy, and expression” (Center for Improvement of Early Reading Achievement 17). Readers achieve fluency when they are able to “focus their attention on making connections among the ideas in a text and between these ideas and their background knowledge” (Center for Improvement of Early Reading Achievement 22). In achieving fluency, word recognition ceases to demand a high amount of cognitive capacity and becomes instead an automatic process which
requires little cognitive capacity while being quick and accurate. Since limited cognitive resource theory argues that “humans have only so much cognitive capacity to devote to a particular task,” by using less cognitive energy on word recognition, more energy is available to comprehend the text being read (Nathan and Stanovich 176).

When readers achieve fluency they are able to spend most of their cognitive energy extracting meaning from the text, allowing them to connect with what they are reading and enjoy the process of reading more. However, a reader who is able to read only through word recognition reads slowly and with difficulty while extracting little meaning from the text. Those who do not achieve fluency often see reading as a tiresome task to be avoided, which leads to a downward spiral of negative consequences as Nathan and Stanovich explain:

Non-fluent reading leads to less reading. Lack of exposure and practice then leads to a continued failure to develop automatic word recognition [fluency]. As a result, practice continues to be avoided or is merely tolerated without real cognitive involvement…since reading unlocks knowledge, develops vocabulary, and facilitates other cognitive skills, these other skills and processes are developmentally delayed as well (Nathan and Stanovich 177).

Children need to attain literacy skills at a young age so they can avoid this downward spiral towards failure. Since the reason for reading is to comprehend and gain meaning from the text, the Center for Improvement of Early Reading Achievement does not even consider reading without the comprehension that comes with fluency to be true reading: “if readers can read the words but do not understand what they are reading, they are not really reading” (48). Hence, by some standards a child who does not achieve fluent reading is not even considered a reading or literate child.
Since literacy is a complex process that requires the attainment of various physical and cognitive skills, there is no ‘right way’ to achieve or teach literacy. Extensive research continues in many areas and disciplines to learn more about how we learn to read and what teaching methods are most effective. At this point it is accepted by most theorists and teachers that a balanced literacy program should be utilized in teaching students how to read. Such a program should include strategies to teach phonemic awareness, vocabulary development, comprehension strategies, critical thinking, and the writing ability to convey meaning to different audiences, while utilizing “activities to promote motivation to read as well as oral and written language development” (New York State Board of Education 17, 23). The assessment categories defined for this project were created in an attempt to demonstrate the key skills needed to achieve literacy, as well as assess how the media of picture books and computer program read-alouds can teach, improve, and demonstrate a child’s mastery of these skills.

**Print and Phonological Awareness:**

Once literacy is obtained and a reader is competent in reading books it is often easy to forget that at one time these ‘objects’ were completely alien to each of us and held no meaning between their covers. At one point each of us was unaware that there are certain ways to use a physical book which will reap the most meaning-filled benefit. In teaching young children literacy, the demonstration of how to interact with a physical book must be taught before literacy achievement at any level can be obtained.
David Lewis states that “children learn what books are for and what reading is as they gradually get used to handling and talking about them with their parents and caregivers” (77). Although young children may interact with a book on their own, a parent or other adult is needed to demonstrate how to physically interact with a book to gain meaning from it through reading. *Book handling skills* include such skills as “identifying the front and back of the book, top and bottom of a book, turning the pages one at a time, moving from left to right, as well as appreciating and respecting books” (Jalongo et al. 168). As children begin to understand how to handle a book (the earliest stages of print awareness), they form the foundation upon which the development of more advanced skills in print awareness are built.

*Print awareness* is an “understanding of certain basic insights and observations about the forms and functions of print” (Allor and McCathren 74). Although the skills that fall under print awareness can vary slightly from theorist to theorist, the basic skills include

(a) knowing the difference between graphic displays of words and non-words; (b) knowing that print corresponds to speech, word by word; (c) understanding the function of empty space in establishing word boundaries; and (d) understanding that we read from left to right and top to bottom (Allor and McCathren 74).

Comprehension of these skills is gained through “meaningful experiences with text” and is required before literacy can be achieved (Allor and McCathren 75).

Print awareness is developed before and during a child’s early years of elementary school. In 2002, the New York State Education Department issued literacy competencies which children should achieve each year from pre-kindergarten through third grade. To
understand the role print awareness plays in a child’s literacy development, a brief overview of the ‘print awareness literacy competencies’ included in the document is as follows. In pre-kindergarten print awareness skills include “understanding that communication is the purpose of print, following left-to-right and top-to-bottom when reading English, distinguishing between letters and words to show awareness of printed letters, and distinguishing between print and pictures” (New York State Education Department 4). By kindergarten children are also expected to develop the skills of “distinguishing between words and letters, tracking print by pointing at written words when texts are read aloud by self or others, and identifying the parts of books (front cover, back cover, title page) and their functions” (New York State Education Department 6). In first and second grade, print awareness skills being developed are listed as “identifying book parts and their purposes including identification of author, illustrator, title page, table of contents, and chapter headings,” while other print based skills (such as phonics – discussed below) are now added to the list of expected competencies (New York State Education Department 8, 10). By third grade print awareness skills such as knowledge of book parts and how to interact with a book should be mastered, yet these insights are only one part of the skills necessary for a child to achieve literacy.

In addition to being taught print awareness skills, children also need to be taught the skills needed for phonological awareness before and during the early elementary years. *Phonological awareness* is the “understanding that oral language is made up of sounds or groups of sounds” (Allor and McCarthen 73). It is a broad category that encompasses a child’s ability to “identify and manipulate larger parts of spoken language,
such as words, syllables…and phonemes, while also including awareness of other aspects of sound, such as rhyming, alliteration, and intonation” (Center for the Improvement of Early Reading Achievement 3).

A more specific subcategory of phonological awareness that children must master is phonemic awareness. *Phonemic awareness* is defined as “the ability to notice, think about, and work with the individual sounds in spoken words” (Center for the Improvement of Early Reading Achievement 2). *Phonemes* are the individual sounds referred to in phonemic awareness and are defined as “the smallest part of spoken language that makes a difference in the meaning of words” (Center for the Improvement of Early Reading Achievement 4). For instance, the word *as* has two phonemes (/a/ /s/), while the words *top* and *check* have three phonemes (/t/ /o/ /p/ and /ch/ /e/ /ck/), and *shake* has four phonemes (/sh/ /a/ /k/ /e/). Phonemic awareness is demonstrated when a child understands that by adding or removing phonemes a word’s entire meaning can be changed or the remaining sounds can cease to constitute a word.

One method of teaching children phonological awareness as related to print is phonics instruction. *Phonics instruction* “teaches children the relationships between the letters (graphemes) of written language and the individual sounds (phonemes) of spoken language….and how to use these relationships to read and write words” (Center for the Improvement of Early Reading Achievement 12). Although the use of phonics instruction in teaching children has been criticized by some who argue that the irregularity of English spellings make the system unhelpful in teaching reading and writing, supporters of the technique argue that the point of phonics instruction is “teaching children a system for remembering how to read words” and that most
irregularly spelled words “contain some regular letter-sound relationships that can help children remember how to read them” (Center for the Improvement of Early Reading Achievement 12). Furthermore, supporters of the method do not endorse phonics instruction as a method of instruction that should stand alone in a literacy curriculum, but rather as a valuable component in a balanced literacy program. There are many different methods for teaching phonics instruction, but for the purpose of this project the basic knowledge of what phonics instruction is and the fact that it connects phonological awareness with print awareness is sufficient.

**Assessment Questions: Print and Phonological Awareness**

In utilizing the category of print and phonological awareness to assess the use of picture books and computer programs in literacy instruction, there are some key components that will be focused on. Since both print and phonological awareness are necessary for the attainment of literacy, many of the skills they require should be utilized and improved by a medium for it to be a useful tool in teaching literacy. Some of the main print and phonological awareness skills that children should be learning through interaction with these media will be assessed through the following questions:

- Does this medium help a child learn how to interact with the text and physical parts of a book?
  - Are book handling skills (i.e. “identifying the front and back of the book, top and bottom of a book, turning the pages one at a time, moving from
left to right, as well as appreciating and respecting books” (Jalongo et al. 168) practiced or demonstrated through interaction with this medium?

- Does the medium help children learn, practice, or demonstrate their knowledge of print awareness skills?
  - Is differentiation between graphic non-words and words practiced/demonstrated?
  - Is the knowledge of word-by-word correspondence between text and speech practiced/demonstrated?
  - Is comprehension of the word boundaries established by empty space practiced/demonstrated?
  - Is the knowledge that English reading runs left to right and top to bottom practiced/demonstrated?

- Is phonological awareness taught, practiced, or demonstrated through the medium?
  - Does it help children identify and manipulate parts of spoken language (i.e. words, syllables, phonemes)?
  - Is the awareness of ‘aspects of sound’ (i.e. rhyming, alliteration, intonation) taught, practiced, or demonstrated?

- Are the rules of phonics taught, practiced, or demonstrated through interaction with this medium?

**Comprehension**
The Center for Early Reading Achievement argues that “comprehension is the reason for reading, hence, if readers can read the words but do not understand what they are reading, they are not really reading” (48). Likewise, the National Reading Panel states that “comprehension is critically important to the development of children’s reading skills and therefore to the ability to obtain an education” (13). *Comprehension* in both statements utilizes the general definition of the “act or action of grasping with intellect; understanding” (Merriam Webster Online), and is demonstrated through one’s ability to “answer reasonable questions about a passage one has heard or read” (Biemiller 6). There are two main forms of comprehension which must be attained in order for a student to achieve literacy: Listening Comprehension and Reading Comprehension.

*Listening comprehension* is the ability to understand text that is heard and “answer reasonable questions” about the meaning it denotes (Biemiller 6). On average this ability “begins to develop around twelve months of age and continues to grow long after grade six” (Biemiller 3). To develop listening comprehension children must interact with adults and others through oral language and increase their oral vocabulary knowledge as a result of these interactions. *Oral vocabulary* consists of the “words that we use in speaking or recognize in listening” and is a combination of *listening vocabulary*, the “words we need to know to understand what we hear,” and *speaking vocabulary*, the “words we use when we speak” (Center for Early Reading Achievement 34). Oral vocabulary and language abilities have been linked not only to the achievement of listening comprehension, but also later reading ability since “spoken language vocabulary serves as a ‘scaffold’ in beginning reading” (New York State Education Department 28).
In order to increase *vocabulary*, the “words we must know to communicate effectively,” children must learn new words that they are able to contextualize with their past experiences and knowledge (Center for Early Reading Achievement 34). Knowing a word requires not only *definitional knowledge*, “knowledge of the logical relationship into which the word enters, such as the category or class to which it belongs,” but also *contextual knowledge* which is the understanding of “how the word’s meaning adapts to different contexts” (Stahl 25). Both definitional and contextual knowledge must be understood in order for children to relate the word to their own experiences and knowledge, and in turn integrate the word, its meaning, and possible uses into their vocabulary.

*Schema* are “categorical rules or scripts” which were proposed as ways we “interpret the world” by Jean Piaget’s *schema theory* (Widmayer 1). The basis of schema theory can be summarized as follows:

> all human beings possess categorical rules or scripts that they use to interpret the world. New information is processed according to how it fits into these rules, called schema. These schema can be used not only to interpret but also to predict situations occurring in our environment. Information that does not fit into these schema may not [initially] be comprehended, or may not be comprehended correctly….however, the learner in schema theory actively builds schema and revises them in light of new information (Widmayer 1).

In accordance with schema theory, in order for children to integrate a new word into their vocabulary they must be able to connect the new word, along with its definitional and contextual knowledge, to a pre-existing schema they have created through previous knowledge accumulation or experiences. In the context of literacy, these connections have also been labeled *referent connections* which connote the development of a mental
connection between background experience and information, and the object or concept to which a “word sound” refers (Biemiller 12).

Young children’s referent connections and vocabulary can be increased through visual/verbal interaction with adults or peers, or visual/verbal interaction with pictures and texts. For instance, if a young child has a pet beagle at home which the child has heard parents refer to as a ‘dog’ the child will create the schema that a ‘dog’ looks and acts like his beagle. If that child then goes to pre-school and is read a story about a poodle which is labeled as a ‘dog,’ the child will first check with his schema of what a dog looks like (a beagle in his experiences), and may either reject the idea that the poodle is also a dog or simply integrate the new information into his existing ‘dog schema.’ In an ideal situation, the child will voice the discord present between their ‘dog schema’ and the poodle in the book, and will then be taught that there are many different kinds of dogs with many different names. In this situation the child would not only alter his existing ‘dog schema,’ but also gain at least the new vocabulary word ‘poodle’ and possibly other new ‘dog-related vocabulary’ as well. In this way children’s schema are continually being altered to give them a better understanding of the world around them and how to communicate with others in that world.

In a similar fashion children must also gain a sense of narrative comprehension through their listening comprehension. *Narrative comprehension* is the comprehension of basic story structure and the components inherent in it. From an early age children’s interactions with stories are teaching them that there are different main components that make up a story (such as a beginning, end, sequence of events, etc.). An example of a child demonstrating these skills would be one who begins a story she is telling (or inserts
into one she is hearing) the fairy tale beginning ‘once upon a time’ or ends it with a conclusive ‘the end.’ Other skills that demonstrate a child’s narrative comprehension are “making predictions about story events, retelling stories with attentiveness to the sequence of events and main ideas, and noticing when sentences/events in a story do not make sense in relation to the rest of the story” (New York State Education Department 4, 6, 8). Attainment of these skills aids children in achieving listening and reading comprehension, as understanding basic story structure helps them understand the framework/logic of the story. This in turn allows them to focus more of their cognitive ability on understanding the meaning behind the story being heard or read.

The number of opportunities children are given to interact with stories and other forms of verbal communication play a large role in the size of their vocabulary and comprehension. Since the majority of a child’s vocabulary is created orally through such interactions during early childhood and “children use the words they have heard to make sense of the words they see in print,” a child’s oral vocabulary knowledge and understanding of story structure are key components in how successful they are in learning to read and extract meaning from text (Center for the Improvement of Literacy Achievement 34). This importance of vocabulary knowledge has been known for many years as “one of the oldest findings in educational research is the strong relationship between vocabulary knowledge and reading comprehension” (Stahl 3).

*Reading comprehension* is defined as “intentional thinking during which meaning is constructed through interactions between text and reader” (National Reading Panel 14). On average this ability “begins to develop in kindergarten or first grade” (Biemiller 3), and is built upon a child’s prior attainment of listening comprehension. As Andrew
Biemiller states, “during elementary school, at any given time, a child’s maximum level of reading comprehension is determined by the child’s level of listening comprehension” (1). Hence, children’s attainment of oral vocabulary is a key component in their achievement of reading comprehension; however, other ‘print based’ vocabulary play an important role as well.

Reading comprehension is not only dependent on our oral vocabulary but also on our reading vocabulary, or the “words we recognize or use in print; the words we need to know to understand what we read” (Center for Improvement of Literacy Achievement 34). Oral vocabulary must act as a ‘scaffold’ for the attainment of early reading vocabulary, since “as beginning readers, children use the words they have heard to make sense of the words they see in print” (Center for Improvement of Literacy Achievement 34). The importance of vocabulary instruction in achieving reading comprehension has not only been proven through research which suggests that “vocabulary instruction leads to gains in comprehension” (National Reading Panel 14), but is also backed by various educational theories such as the instrumentalist hypothesis. The instrumentalist hypothesis argues that the “knowledge of words causes readers to comprehend text” (Stahl 5). This theory presents the implication for teachers that “teaching word meanings should improve comprehension,” and therefore vocabulary instruction is an integral part of any balanced literacy program (Stahl 5). However, vocabulary is not the only determinant factor in a student achieving reading comprehension.

As discussed earlier, students need to master various skills of print and phonological awareness in order to achieve literacy. Children must not only learn how to decode words through word recognition, but must also achieve reading fluency through
automatic word recognition in order to draw meaning from the text. With more practice in reading and in turn developing fluency, less cognitive capacity is utilized in the act of decoding the words on the page, providing more cognitive energy to understand the meaning behind the text. Furthermore, the more background knowledge children have from various forms of vocabulary, knowledge, and experiences, the more schema they have to make referent connections to the text they are reading. This in turn increases their reading comprehension. Hence, children must master these various literacy skills in order to achieve reading comprehension, yet, there are other strategies which teachers may use in order to improve their students' reading comprehension as well.

Research has demonstrated that teaching students to ‘develop and apply reading comprehension strategies to enhance understanding is intimately linked to students’ achievement in this area [reading comprehension]” (National Reading Panel 13). Comprehension strategies taught in the classroom should aid students in “engaging in intentional, problem-solving thinking processes” and teach them how to “use specific cognitive strategies or to reason strategically when they encounter barriers to understanding what they are reading” (National Reading Panel 14). After reviewing almost 500 studies on comprehension strategy instruction, the National Reading Panel has defined seven types of instruction which “appear to have a solid scientific basis for concluding that these types of instruction improve comprehension” (15). These seven types of instruction are as follows:

- **Comprehension Monitoring**, where readers learn how to be aware of their understanding of the material;
- **Cooperative Learning**, where students learn reading strategies together;
• **Use of Graphic and Semantic Organizers** (including story maps), where readers make graphic representations of the material to assist comprehension;

• **Question Answering**, where readers answer questions posed by the teacher and receive immediate feedback;

• **Question Generation**, where readers ask themselves questions about various aspects of the story;

• **Story Structure**, where students are taught to use the structure of the story as a means of helping them recall story content in order to answer questions about what they have read; and

• **Summarization**, where readers are taught to integrate ideas and generalize from the text information (National Reading Panel 15).

Although any of these strategies can be taught by itself, multiple strategies used in combination are preferable. Appropriate use of such strategies is reported to “assist in recall, question answering, question generation, and summarization of texts” (National Reading Panel 15). Improvement of these skills, in turn, helps readers to not only better understand the meaning of the text when they are reading it, but also store more of the information presented by the text in their memory.

Reading comprehension is hence the ‘essence of reading’ which is “essential not only to academic learning in all subject areas but to lifelong learning as well” (National Reading Panel 13). Without the achievement of reading comprehension the “text is merely ink on paper” which represents only frustration for a non-literate child who can not decode its markings (Ellsworth et al. 221). However, once a child becomes a literate reader the meaning embedded in the print can be constructed through the child’s interaction with the text. Unlimited new worlds of information based in the real world
and imaginary realms are opened for the child who has attained the skills of reading comprehension.

**Assessment Questions: Comprehension**

In utilizing the category of listening and reading comprehension to assess the use of picture book and computer software read-alouds in literacy instruction, there are some key components that will be focused on. Since both listening and reading comprehension are necessary for the attainment of true literacy, many of the skills required for these abilities should be utilized and improved by a medium for it to be a useful tool in teaching literacy. Some of the main skills that children should be learning through interaction with these media will be assessed through the following questions:

- Does the medium present opportunities for children to interact with adults and others through oral language in order to increase their oral vocabulary knowledge?
- Does the medium help to increase oral vocabulary (listening and speaking) in some way?
- Does the medium test or expand children’s definitional or contextual knowledge of words in their vocabulary?
- Does the medium present ways to increase children’s referent connections with new information/words and their existing schema through visual/verbal interaction with adults, peers, pictures, or text?
- Does the medium test or teach children the main components of story structure?
o Are children asked or able to make predictions about story events through interaction with the medium?

o Could retelling of stories, with attentiveness to the sequence of events and main ideas, presented through the medium be practiced or demonstrated?

o Does the medium ‘test’ if children notice when sentences/events in a story do not make sense in relation to the rest of the story?

- Are students’ reading comprehension skills practiced or demonstrated through interaction with the medium?

  o Is it apparent they are “engaging in intentional, problem solving thinking processes” (National Reading Panel 13) through interaction with this medium?

- Are reading comprehension strategies taught through interaction with the medium?

  o Did the medium help students become aware of their understanding of the material?

  o Does the medium allow for students to learn through cooperation with their peers?

  o Does the medium help students understand how to utilize graphic or semantic organizers?

  o Can the teacher present students with questions based on their interaction with the medium?
o Does the medium encourage or lend itself to helping students create their own questions about the story/information presented?

o Does the medium demonstrate components of story structure?

o Does the medium present a story or information with which students can utilize the strategy of summarization?

Social Context

Although reading may often seem to be more of an independent ability, its achievement is very much a social process. Andrew Biemiller states that broadly speaking, language can only ‘grow’ through interaction with people and texts which introduce new vocabulary, concepts, and language structures. In grades 1-3, this growth cannot result mainly from reading experiences because most children are not reading content that is as advanced as their oral language (4).

Similarly, Patricia A. Antonacci and James M. Colasacco state that “just as learning to speak and learning to mean are social processes, so is learning about the print conventions of language” (Ellsworth et al. 220). Since language and writing are ways of communicating with others, it is logical that we learn the processes from those we wish to communicate with.

Some educational theories do not limit the importance of social interaction to language conventions, but also argue that any form of learning is necessarily a social process. Lev Vygotsky, a renowned theorist who “focused on the cultural and
collaborative aspects of early learning,” proposed the social-constructivist model of learning (David et al. 24). This model proposes that “children actively construct their knowledge with the help of more knowing others….hence, learners are interdependent” (David et al. 10). Although according to Vygotsky’s theory, peers can constitute our ‘more knowing others,’ it is less likely that peers will help in the increase of oral vocabulary or other skills necessary for listening and reading comprehension in the early elementary classroom. Most children at this level are still working with a rather rudimentary level of vocabulary on their own and have not yet mastered the new reading skills being introduced in the classroom. Therefore the model stresses the importance of adult interaction in the learning process through “the adult’s attention to what the child is trying to learn, what might be the next step in that learning, and how the adult can present the learning experience for the child to access” (David et al. 24). Widely accepted in the realm of educational research, this theory emphasizes that most often without interaction with a ‘knowing’ adult, children’s learning and literacy abilities will not develop.

As discussed earlier, children need to interact with adults in order to gain print awareness. Without the demonstration of how to interact with a physical book or the explanation of the different parts of a book, the book remains an alien object for a child. As David Lewis states “for young children, books are…highly unusual objects…children learn what books are for and what reading is as they gradually get used to handling and talking about them with their parents and care-givers” (77). Without observing an adult with a book, children may not learn that there are infinite amounts of information and meaning nestled in its pages.
Another essential aspect of literacy that is learned through interaction with adults is oral vocabulary. Oral vocabulary development begins during early childhood and is mostly acquired through interaction in the home during the years before school begins. Many studies have shown that “children who grow up in low-income/poorly educated families are likely to have smaller vocabularies and less advanced language development than their more advantaged peers” (Biemiller 13). This is most often due to a lack of “serious engagement in dialogue with language-learning preschoolers” by parents in these less advantaged homes (Biemiller 15). This lack of vocabulary development correlates with findings that “children benefit from interacting with their parents, not simply being talked at or read to, but talked with and read with” (Biemiller 17).

Due to the evidence of the impact that a child’s oral vocabulary, achieved during early childhood, has on the child’s literacy and later learning achievement, many theorists, such as Patricia A. Chiarelli, are arguing that we must now examine those programs that reach out to families in their communities before their children enter school because preparation for literacy must begin before children start school. The early years are crucial for language learning and the best preparation for literacy learning is learning to talk and having many opportunities for conversation (Ellsworth et al. 233).

In accordance with Chiarelli’s argument, many studies have supported the importance of taking steps to improve child/adult language interaction during the early childhood years. For instance, a study carried out by Betty Hart and Todd Risley in 1995 that analyzed the “language and achievement differences between advantaged and disadvantaged children, and differences in their early experiences” concluded that children’s IQ was less correlated with vocabulary size than aspects of parent interaction (Biemiller 14). Rather
than vocabulary size being genetically determined it was found instead to be more closely related to the measure of parent interaction,

combining (a) different words per hour, (b) feedback tone or warmth of interaction, (c) ‘symbolic emphasis,’ (d) ‘guidance style’ (directive vs. suggestive), and (e) ‘responsiveness’ (proportion of parent responses to child-initiated talk),

that a child experienced during their early childhood years (Biemiller 14). Hence, not only do children need adult interaction in order to increase their oral vocabulary; the interaction should be attentive and caring in order to gain the greatest benefits.

Although oral vocabulary is developed the most before a child enters school, it is still possible for children to increase their vocabulary knowledge once they are in the classroom through meaningful interactions with adults. One method for increasing a child’s vocabulary is through adult interaction in which reading is “combined with clarification of unfamiliar vocabulary” (Biemiller 17). This method is based on the argument that “reading alone is not enough; children need more general supportive verbal interaction” (Biemiller 17). In a study on “high-risk, urban first graders whose initial levels of progress led to their placement on a special education waiting list,” Anne Brown and Annemarie Palincsar demonstrated that even when children have been labeled as ‘high risk’ or ‘special education,’ clarification of words helped improve vocabulary and language comprehension (Biemiller 36-37). This study, combined with other similar studies, demonstrates that “providing clarification of words appears to be a necessary component of language building…which can happen in whole class, small group, or individual” instruction (Biemiller 37). In fact, although it was previously believed that small group interaction was needed in order to gain substantial improvement in
vocabulary knowledge, the evidence presented by multiple studies now suggests that “whole group story reading with definitions or ‘clarifications’ may be as effective as more elaborate small group interactive programs for promoting vocabulary development” (Biemiller 39).

Interaction with adults has been proven crucial for children to increase their oral vocabulary knowledge. Since oral vocabulary is the ‘scaffold’ upon which listening comprehension and later reading ability are founded, in most cases adult interaction is essential for a child to successfully achieve literacy as a whole. If children do not receive the needed adult interaction during their formative years, frequently they begin school without the needed vocabulary knowledge to remain on an ‘equal level’ with their peers. As they progress through their school years what may have began as a small difference in vocabulary knowledge could, without adult intervention, become a cumulative vocabulary deficit. This deficit often continues to grow larger and larger as children move through each elementary grade, because “restricted vocabulary makes it harder to add new vocabulary and probably leads to reduced amounts of reading…which in turn continues to restrict vocabulary development” as reading fluency cannot be gained (Biemiller 26). While their peers are mastering fluent reading, students with such a vocabulary deficit are never able to read fast enough or extract enough meaning from their textbooks to achieve academic success in comparison. Hence, the adult interactions children experience, or do not experience, during their early childhood can affect not only their success in achieving literacy skills in early elementary classes, but also their success throughout their educational career.
Assessment Questions: Social Context

In utilizing the assessment category of social context to assess the use of picture book and computer software read-alouds in literacy instruction there are some key components that will be focused on. Since social interaction with adults is necessary to increase a child’s oral vocabulary which is, in turn, essential for the attainment of true literacy, many of the skills attained through interaction with adults should be utilized and improved by a medium for it to be a useful tool in teaching literacy. Some of the main criteria needed for social context to aid children’s literacy skills through these media will be assessed with the following questions:

- Does the medium allow for children to interact with adults and peers during its use?
- Does the medium present a way for children to obtain ‘clarification’ for new words (if adult interaction is not possible with the medium)?
- Is this medium one which could be obtained and utilized by parents in low-income/poorly educated homes to increase their child’s print awareness, oral vocabulary knowledge, and reading comprehension during early childhood years?
- Is this medium one which could be obtained and utilized by community groups/programs which reach out to low-income/poorly educated parents in an attempt to improve a child’s print awareness, oral vocabulary knowledge, and reading comprehension during early childhood years?
Section Conclusion

Discussion of the cognitive steps taken and key abilities needed to achieve literacy demonstrates the complexity of the process of learning to read. Various studies have shown that even a small deficiency in the skills required to achieve literacy when children begin school, can result in continuing difficulty and frustration throughout their educational career. It is of up-most importance that research now turn to learning what methods and programs will have the greatest effect in giving all children a more equal chance at achieving literacy and ensuing academic success from their early childhood years on.

This interdisciplinary project is an attempt to better understand the inherently interdisciplinary process of literacy achievement in hopes of learning what media may be best utilized in helping children achieve literacy. As American culture becomes more and more technology-saturated, a comparison of picture book and computer software read-alouds, and their use in aiding early childhood/elementary literacy achievement is therefore an attempt to learn what can be done to improve literacy in American culture today. It is hoped that analysis and comparison utilizing the assessment categories defined in this section, print/phonological awareness, comprehension, and a nurturing social context, will lead to a better understanding of which direction literacy instruction should move more towards now: that of the traditional picture book or the modern computer program.
Chapter 2

Evolution of Media in the Classroom:
The Persistence of Books
As discussed in previous chapters, there are many skills that students must obtain before they can be truly literate. Likewise, there are many different methods that can be used for teaching some or all of these skills and no single method can be deemed the best or only way to teach literacy. As technology advances, the number of methods that can be used in the classroom is continually increasing as new media are becoming available for classroom use. With less than seven hours in a school day and so many options to choose from, teachers need to research the various methods and media to learn which have been shown to teach or improve literacy skills in real classroom environments. The history of the medium and its success in classroom practice should be understood before teachers choose to refuse or implement new media into their classroom literacy curriculum. For the purpose of this study a brief history of picture books and computers, and their evolution in regards to classroom use will now be visited.

Evolution of Picture Books in the Classroom

Although difficult to conceive today, at one point writing of any form was a new invention held in contempt by some of the greatest academics of the time. For instance, although a written work itself, Plato’s dialectic text *Phaedrus* discusses his teacher Socrates’ disdain for the new invention of writing. Socrates saw little value in the art of writing as he believed it does not produce new knowledge but is simply “a reminder to a man, already conversant with the subject, of the material with which the writing is concerned” (www.siu.edu/departments/english/acadareas/rhetcomp/phaedrus.html). He believed writing would cause those who use it to “become dependent on it and soon stop
thinking altogether” (Chandler and Marcus 1). Hence, although today most would agree that without writing we would have lost much of the knowledge we have accumulated throughout the centuries since Socrates’ lifetime, at one point some of the brightest minds could not see the academic value inherent in such an invention. Luckily, other academics of the time, such as Plato himself, did see the value in recording knowledge through writing and disputed Socrates’ argument that “thought would be lost with the adoption of writing” with the belief that “study becomes possible when there are written words” (Collins, Neville, and Bielaczyc 144).

Despite Socrates’ skeptical beliefs about writing, the upper classes and academics became enthralled with the written word. Literacy was born, yet in most cases it was a privilege reserved for those of a high class standing. All books were painstakingly hand-copied, hence, there were few in circulation and each copy was of great value (Davies 5). However, Johann Gutenberg’s invention of the printing press in the 1450s made books more plentiful and affordable, while presenting the masses with the potential to become literate (www.bl.uk/treasures/gutenberg/background.html).

The advent of the printing press made many books available to more people at lower costs, but with this availability came criticism. Those who already enjoyed the privilege of reading and owning the few available handwritten books suddenly argued that “an abundance of books makes men less studious” and considered the printed book a cheap waste in comparison to the “superior handwritten manuscript” (Davies 5, 7). Soon it was not just the books that bothered these privileged individuals, because as books became more available there was increased outcry for an educational system for all classes of people. Cities began creating institutions for public education which led critics
to “proclaim that there were too many schools” (Davies 7). Voltaire demonstrated the
disgust the upper class felt at the idea of educating the poor when he stated that “the
lower classes should be guided, not educated. They are not worthy to be educated”
(Davies 7). The financially and academically privileged fought against the shared
education that they realized would encourage independent thinking. Yet the upper class’s
efforts were not enough to stop the presses or close school doors. The foundation for the
educational system now used in American society had begun to develop and thrive.

It was upon the foundation of writing and printed books that literacy developed
and institutions for public schooling were established. Since these inventions, especially
that of the printing press, “the key to intellectual growth and development…has been
universal reading and writing” (Withrow 43). The effect of these inventions on education
is demonstrated by the fact that when the “printing press was scarcely a century old”
there was an “incipient drive to create schools” as a result of the increased availability of
books to the masses (Davies 7). Clearly then, the central medium for classroom teaching
began as books, however, the type of books used in the classroom has changed drastically
through the years.

The books used in classrooms during the three hundred years following the advent
of the printing press were not as focused on enhancing emergent literacy by engaging
children’s interest, as they were in teaching children “behavior appropriate to their status
in society” (Nikolajeva 29). The rise of the educational institution had resulted in the
educational system being deemed the authority determining the acceptable nature of
children’s literature (Nikolajeva 29). The educational system determined what books
were appropriate for children and placed these in the classrooms, whereas those deemed inappropriate were censored from children both in and out of the classroom. Some of the first official books [deemed appropriate and utilized in classrooms] for children were ABC books, primers, and horn books whose main goal was to teach the child how to read, primarily for religious purposes and in accordance with a certain religious-educational doctrine (Nikolajeva 30).

However, these ‘official books’ were usually so overly moralistic and dull that they held little appeal for the child reader. The educational system was not inclined to sugarcoat the moral tales they deemed appropriate as they “regarded reading as a gateway to higher religious enlightenment, but absolutely not as a means of entertainment or pleasure” (Nikolajeva 30).

By the eighteenth century children had found entertaining reading by themselves in the form of the *chapbooks* which were becoming increasingly available for literate adults (Nikolajeva 31). Catering to a growing literate population, inexpensive chapbooks were widely circulated throughout villages and towns and hence easily accessible for most children. The educational and religious systems found the reading of such materials to be a frivolous, waste of time and soon began to fight the popularity of chapbooks by “offering children alternative reading material” that was geared specifically towards their interests (Nikolajeva 32).

In an effort to steer children away from reading chapbooks, the educational system and commercial publishing market began to develop books children would enjoy and which were “something more than merely a vehicle for achieving religious goals” (Nikolajeva 33). A variety of texts were offered such as “moral stories, animal stories, instructive stories, primers, and readers” which were all slowly integrated into the
educational system (Nikolajeva 33). Soon commercial publishers saw the potential for a large market and began working on ways to create new texts which would not only appeal more to the child but also to the adult as well.

By the mid-eighteenth century, John Newbery was the “first commercial publisher who was successful in building a solid publishing business for children” (Nikolajeva 33). One of Newbery’s most influential advances in the format of children’s literature was the integration of illustrations into his children’s stories. Although a feature borrowed from the ill-reputed chapbooks, which often had a few pictures to illustrate their adult focused stories, the innocent nature of the children’s stories that were illustrated and their moralistic plots kept them from being banned by the educational system (Nikolajeva 34). Soon illustrated texts filled classroom and entertainment reading time for children, and the new genre of children’s literature emerged.

As innocent as the format of children’s literature may seem, even today children’s books, especially picture books, cannot escape criticism. Since we now know that early childhood is when children form many of their ideas about the world around them, and that early childhood experiences can influence future values and ideology, children’s literature is continually scrutinized for anything that might cause a child to adopt ideologies that are deemed ‘unacceptable’ by society at large (Hunt 1). Although censorship was enforced to a greater degree by the educational system before and during the early stages of the establishment of children’s literature as its own genre, censorship is by no means a thing of the past. Today adults still censor what books children can read, though this censorship is far less overt as it is done ‘behind the scenes’ through publishing firms, school/public libraries, classrooms, and parental restrictions (Hunt 6).
As concerns of being ‘politically correct’ have already invaded nearly every arena of our lives, there is little doubt that children’s literature will remain a watched medium for many years to come.

Concerns over ideological influence or political correctness are not the only reasons picture books are critiqued today. Although children’s literature has now been around as a fairly independent genre since the eighteenth century, there are still many who look down upon it much as the academics of the ‘handwritten manuscript era’ looked down upon printed books in the fifteenth century. For instance, many “English departments sneer at children’s books as the ‘literature with the washable covers’” rather than embracing it as a creative and unique literary art (Beckett 24). Furthermore, many literary critics consider the subject matters addressed in children’s literature to be ‘inferior’ to adult literature as well, and argue that “children’s literature needs to grow up to become adult literature, just as its readers need to grow up to become adults; with praise often meted out according to how close a book comes to that adult ideal” (Beckett 24-25). As a result, some still view children’s picture books as something merely for a child’s entertainment and less as an educational tool to be utilized in the literacy curriculum. However, today more and more educators and researchers are praising the use of picture books in the classroom as a useful medium for helping young children gain the skills needed for emergent literacy. The unique picture-text format of the picture book has been found to enhance the achievement of the foundational skills needed for children to develop literacy in ways that many other media cannot.

Today most elementary classrooms either have a classroom library of age-appropriate children’s literature or access to a school library. In the early elementary
grades children are still learning to simply decode the words presented in books, and may have difficulty interacting with a book on their own. It is for this reason that the *picture book* is a useful educational tool for young children. The picture book is understood through the interaction of pictures and text, with pictures often representing the main events taking place in the story (Ellsworth et al. 116). This format is ideal for young children’s learning as research has “recognized that infant and early childhood learning is concerned almost exclusively with *visual learning*” (Ellsworth et al. 116). Picture books are useful in teaching emergent literacy skills as children are presented with a language they are familiar with, that of visual images, which helps introduce them to the unfamiliar language of printed text.

Just allowing children to interact with books, if they are not capable of reading them, will not enhance their literacy skills as much as hearing the words that go with the pictures and interacting with an adult. Picture books have been shown to play an important role in the literacy classroom through teacher *read-alouds*. Research has found the most effective form of read-alouds to be those which utilize *dialogic reading* as their method of telling the story and interacting with listeners (Neuman et al. 6). This method, “asking who, what, and when questions, then following children’s answers with questions, praise, and encouragement,” enhances student-to-student and student-to-teacher conversation while encouraging children to think about and interact with the text they are hearing (Neuman et al. 6). The intellectual and social interaction presented by a picture book read-aloud, enhances children’s attainment of literacy skills in the early elementary classroom. Further discussion of the benefits and disadvantages of this method will be presented in a later chapter.
Evolution of Computers in the Classroom

Although computers have only been available for classroom use for a few decades, since the early twentieth century “the classroom has become home to a succession of technologies that have been tailored to the dimensions of classroom practice” (Cuban 2). Technologies such as film, radio, and television, have been introduced and touted as being revolutionary in the way they would alter the classroom environment. As each new technology was introduced to teachers they all came with promises, similar to those that now accompany the computer, of “individualized instruction, relief of the tedium of repetitive activities, and presentation of content beyond what was available to a classroom teacher” (Cuban 4). The computer’s introduction into the classroom is still so recent, and its capabilities continue to improve so rapidly, that the research on its effects on classroom environment or literacy curriculum remains scarce. A brief look at the evolution of technologies leading up to the computer and how they affected the educational system will provide helpful background in contextualizing the computer’s relationship with the educational system today.

At the beginning of the twentieth century classroom organization was fairly similar to that which students are familiar with today (Cuban 9). By 1910, schools were getting their first taste of the ‘modern technology’ made available by electronics as motion pictures entered the classroom as the newest teaching medium. Although the “earliest use of film in the classroom was a novelty with no organizational support behind it….classroom use of films became a symbol of a progressive teaching approach” and
quickly won the excited approval of the public (Cuban 12). The use of films was seen as so innovative, that by 1913 Thomas Edison was quoted as saying that “books will soon be obsolete in the schools, scholars will soon be instructed through the eye. It is possible to touch every branch of human knowledge with the motion picture” (Cuban 11). Nearly a century later Edison’s overly-optimistic prediction still has not become a reality.

Although schools began the implementation of film in classrooms, they soon found four obstacles which kept them from increasing film use:

1) Teachers’ lack of skills in using equipment and film
2) Cost of films, equipment, and upkeep
3) Inaccessibility of equipment when it is needed
4) Finding and fitting the right film to the class (Cuban 18).

Despite these obstacles, film has remained a tool that teachers use in classrooms, however, its role is now that of a supplemental tool rather than the principle classroom medium Edison dreamed of.

As the excitement for film use in the classroom began to fade a new dream began to take shape in the educational system – ‘textbooks of the air’ (Cuban 19). In 1923, Haaren High School in New York City became the first school to use a radio to teach classes. Soon many more schools were installing radios and listening to the various ‘classes’ they broadcasted throughout the school day. By 1932, Benjamin Darrow, a main promoter of radio-taught classrooms, stated that

the central and dominant aim of education by radio is to bring the world to the classroom, to make universally available the services of the finest teachers, the inspiration of the greatest leaders…and present unfolding world events which through the radio may come as a vibrant and challenging textbook of the air (Cuban 19).
Although radio usage in the classroom did increase, by the mid-forties schools were beginning to abandon the new technology citing problems such as lack of equipment, malfunctioning equipment, problems coordinating school schedules with broadcast times, difficulty finding programs related to curriculum, lack of funding, and the belief that class work was more valuable (Cuban 25). As with the use of films, schools began to drift away from the ‘textbooks of the air’ dream and return to a book centered curriculum.

Within only a few years, a new technology had gained enthusiastic support as the era of television developed in America. In 1953, the first schools began implementing instructional television into their curriculums (Cuban 27). “Growing criticism of school quality across the nation…heightened concerns about overcrowded schools, and established a context for identifying improved schools as a priority” (Cuban 28). Many believed that classroom use of television would be able to implement the needed change. Concern about school improvement led to the donation of private and federal funds to help develop classroom television. By 1961, over $20 million had been invested by the Ford Foundation’s Fund for the Advancement of Education, in 1962 President Kennedy authorized $32 million of federal aid, and by 1971, over $100 million had been given by public and private sources in an attempt to help schools across the country use this new technology (Cuban 28). However, soon funding began to run out and although televisions remain in many classrooms as supplemental media and have replaced the use of radio instruction, they never became the “surrogate teacher” that many school administrators and reformers had envisioned (Cuban 37).
Instructional television was still being used in a number of classrooms in the late 1970s when computers were first introduced into schools. The ‘computer mania’ that was gripping the nation spilled into school districts around the country, and caused parents to call for computer use in the classrooms. The room-sized mainframe computer which was used by large businesses during the forties and fifties had given way to the much smaller microcomputer in the early 1970s making it possible for people and schools to purchase the machines (Stallard and Cocker 23). “By 1984, the average elementary school had 5 machines, while the typical secondary school had just over 13” (Cuban 79). In the late ‘80s and early ‘90s the computer network also started to be promoted for classroom use as Apple advertised classroom networking as a way for teachers to connect with all of their students at once (Cuban 87). More and more, advertisements and parents were pushing for increased numbers of computers in the classroom with a goal of eventually having a computer for every child. Manufacturers began creating software that could be used in the classroom as computer-assisted instruction (CAI) to teach mathematics, writing, and reading (Stallard and Cocker 24). By the 1990s the Internet was developed and available for public use and the “push to put desktop computers in schools paled in comparison with the effort to wire the schools for ‘access’” (Stallard and Cocker 34). Despite the urgent calls for computer integration in the classroom, like many of the other technologies that have been introduced for classroom use over the decades, computers have been confronted with and continue to deal with many obstacles.

Although schools have been trying to integrate computers into their classrooms since the late 1970s, recent surveys found that even at the end of the 1990s “schools had
relatively little computer equipment, particularly up-to-date technology, compared to the number of potential student and teacher users” (Anderson and Ronnkvist 3). With the “useful life cycle of computers…shrinking down to as few as 3 to 4 years” the obstacle of continuing to update classroom technology does not appear to be an issue that will soon be remedied (Anderson and Ronnkvist 6). As with film and radio in the classrooms, often buying and maintaining the equipment proves to be a large financial strain on school budgets already stretching to make ends meet (Stallard and Cocker 48). As Dr. Jane M. Healy states, the public push for technology has in many cases caused schools to cut other education and extracurricular programs while technology expenditures rise:

    even in the face of massive technology expenditures, overall school budgets are being cut, and the humanities are the first to go. Even though experiences in the arts and physical education motivate students, increase overall brain power, and support curriculum, art and music rooms are being morphed into computer labs, teachers’ supply budgets are cut, and PE classes are sliced away in the name of economy (Healy 93).

If the funding is found to buy computers another obstacle has been deciding where to put the computers once they are in the school. Although the most ideal situation is to have multiple computers in the students’ actual classroom so they can be easily utilized at any point during the school day, this set up requires the purchase of large numbers of computers. Often the computers available for student and teacher use are all placed in a shared computer lab. Unfortunately, a shared lab set up makes curriculum integration of computers more challenging for teachers who already report having difficulties finding ways to integrate technology into their curriculums in a meaningful way. Furthermore, many teachers lack the training to know how to work the
machines or even attempt to integrate them into their lesson plans. Even though schools’
technology budgets are supposed to spend one-third to one-half of their resources on the
training of teachers, as late as 1997 “only 15% of teachers had received at least nine
hours of training in educational technology” (Healy 64). Without this vital training
many teachers avoid utilizing technology or if it is used they simply allow children to
play on the computers during recess or study hall. Clearly, the integration of computers
into classrooms today is dealing with many of the same problems (lack of funding and
teacher training, equipment malfunctions, and difficulty with curriculum integration)
previous technologies dealt with as they were implemented into course curriculums.

In addition to these obstacles, there are still critics who are concerned about the
integration of computers into early elementary classrooms. Some question how
interactive working with a computer really is for a young child or if its ‘interaction’ for
young students merely “consists of pressing a key and looking at the show” rather than
the student actually engaging with the text or program being used (Healy 48). Similarly,
many argue that working on a computer is negatively affecting young children’s learning
habits as they learn

don’t stop to think, don’t work the problem through, don’t
read the few text screens (even if they could), just jump in
and try something – if it doesn’t work you can blow it up,
start again, or switch programs (Healy 46).

Many critics question how educational and constructive computer software is in
teaching young children literacy and other academic skills, and if the software is helping
children improve their “language ability - including the power to listen carefully,
understand what others are saying and express ideas effectively” (Healy 48).
There is further concern about children’s health in relation to increased computer time. As adults are spending more and more time on computers at the workplace and home, doctors are beginning to see an increase in computer-related health problems (such as vision problems, back pain, carpal tunnel, etc). There is concern that “if something is harmful to full-grown adults, it may carry even greater risk for the developing child, as fast-growing biological systems are most vulnerable to damage” (Healy 111). In addition to the problems being seen in adults, young children may experience even more health issues as time which should be filled with physical activities that enhance coordination and physical health is replaced by sedentary time spent in front of a screen.

Possibly the biggest worry about having computers in school classrooms is that untrained teachers are not actively using computers as teaching tools but are assuming that just having children play with the computers will teach them something. Many researchers and educators are pointing out that simply having a computer in the classroom will not yield educational results, rather the computer must be utilized as an educational tool by the teacher (Healy 76). Various studies have found that computer programs are “only as good as the teacher facilitating them” and that one of the most important factors in creating an environment that endorses the acquirement of literacy skills is teacher-student or student-student language interaction (Healy 87, 92). Computers can be utilized as very useful educational tools, yet it is becoming clear that just as with most other educational tools, including picture books, they must be used correctly for them to truly affect student learning. Although the criticism of computers as educational tools seems daunting, there is still value in having children work with
these machines. Further discussion of the benefits and disadvantages of this method will be presented in a later chapter.

This brief overview of the evolution of picture books and computers in relation to education demonstrates that although many of the inventions and technologies which acted as precursors for these two media all faced criticism, nearly all found a place in the educational system in some capacity. Even today many of these media act as valuable supplemental tools, however, historical analysis demonstrates that books continue to be the central medium in the classroom. This study will now turn to the task of discussing how physical format is related to the persistence of books in the classroom.
Chapter 3
Format Over Function
Through his studies of “how different symbol systems develop different forms of intelligence,” Gavriel Salomon of the Hebrew University has demonstrated that the physical format of a medium may have just as much effect on a student’s learning as the function of the medium (Healey 143). Salomon argues that “different symbolic forms of representation are processed by different sets of mental skills and capacities” (Salomon 376) and therefore “children who learn in one medium (screen vs. page) will always be inclined to prefer the one in which they learned” (Healey 234). When analyzing the media of picture books and computers, it is then important to look not only at how they can function in a classroom, but also at how their physical format may affect their use in an educational environment. The physical format should be compatible with a classroom’s spatial availability and financial limitations. Furthermore, to be successfully utilized in an elementary literacy curriculum, the format should present information through both pictures and text, and it should be able to enhance social interaction and individual engagement with the medium.

Of the many features affected by a medium’s physical format one of the most important is the child’s interaction with the medium. Interaction as defined by Merriam Webster is a “mutual or reciprocal action or influence;” however, for the purposes of this paper, the term ‘interaction’ will also entail a form of engagement (Merriam Webster Online). In this case, it should be possible for an observer to see that a medium is “holding the attention” or “inducing the participation” of a child in order for the child to be interacting with the medium (Merriam Webster Online). Interaction is important, because simply having picture books or computers in the classroom cannot guarantee that children will gain from them. In utilizing any form of medium, the results often depend
on an adult’s or teacher’s guidance of a child’s interaction with the medium. As Jane Healy notes “any medium can build cognitive abilities if the child is investing serious effort in ‘knowledge extraction’ – expending mental effort to learn something” yet “the key to positive use of any medium is the quality of the adult-child interaction” (73, 143). Therefore it is important that adults understand how a medium’s format can be best utilized for educational enrichment and take steps to ensure the medium is used in that manner.

**Spatial Availability**

In evaluating the usefulness of a medium in a classroom one important feature to consider is the physical space available in the classroom or school. In 2000 the “Government Accounting Office stated that 60 percent of school buildings suffer at least one major structural problem” (McLaughlin and Bavin 28). Many of America’s public schools are in such a dilapidated state that they are fighting to maintain and repair main structural components such as “plumbing, roof integrity, lighting, and safety” (McLaughlin and Bavin 28). Often the schools with the most structural problems are in areas with the least funding available for such renovations. Meanwhile schools around the country are also facing issues of overcrowding. For instance, in 2003 statistics showed that “Florida adds almost 60,000 public school students a year while New York City’s enrollment grows by 25,000 annually” (McLaughlin and Bavin 28). With schools already facing such structural and crowding problems, it is clear that many school
buildings cannot simply add new space as they please. Space availability must hence be considered when attempting to integrate new media into the classroom.

Although a single picture book takes up little space, space for books is still an issue. “Most research suggests that at least five to eight books per child is necessary to support choice and motivation to read” (Neuman et al. 8). While this quota of books per child often can arguably be covered by a school library, it is still desirable to have a separate classroom library in which children can spend free time. Research has found that “children are more likely to use books and actively participate with others in book-related activities when there is a special place to enjoy them” (Neuman et al. 9). In creating this special place there are some “preferable design features for the classroom library” such as “partitions…on at least two sides to help set the library apart from the rest of the classroom; ample space to accommodate about four or five children at a time; comfortable furnishings such as pillows, carpeting, and beanbag chairs; open-faced and traditional bookshelves….and literacy displays and props” (Neuman et al. 9). Clearly a classroom library area that follows all of these guidelines may take up too much space for many already crowded classrooms, yet it is important to realize that none of the guidelines given require any form of permanent structural alteration in the classroom. Hence, utilizing only some of the design features which take up less space and are movable, may be compatible with smaller classrooms while still creating a special place that will enhance student interest in reading and engaging with books.

As with the gathering of books into a school library rather than classroom library, most schools first began installing computers in computer labs which classes visited as a group. Although computer labs are still in use, more and more educators and researchers
are arguing for integration of computers into the classrooms; however, this integration again requires physical space (Healey 69). A single desktop computer clearly needs more space than a picture book. Just as picture books stored in a classroom require crates or shelving, a computer also requires a desk or table on which it can be set up. The “developing rule of thumb” is for classrooms to have an average of one computer for every four students (Healey 69). Using this guideline, in order to supply a class of 20-25 students with an ‘adequate’ number of computers, it can be estimated that teachers would need to find space in the room for about 5-6 extra desks. This is a difficult task when just fitting the desks for students into the classroom may be a challenge. However, the spatial worries concerning classroom computers can also require more structure-altering solutions. Charles Stallard and Julie Cocker note that “the readiness or condition of the school building itself frequently presents significant obstacles to appropriate computer use” (41). Many schools are so old that extensive electrical rewiring is required to support multiple computer use in a lab or classrooms. Some schools have even bought computers for classroom or lab use, set them up, and then learned that wiring cannot be done as the walls contain asbestos or there are other unforeseen structural problems (Healey 65). However, if such problems are overcome and some extra space can be found in a classroom, a teacher may utilize less than the recommended number of computers while still presenting students with some opportunity to work with a computer.

Financial Limitations
With over half of the nation’s schools working in buildings with major structural problems that are waiting for funding to be repaired, it is clear that financial limitations play a large role in determining what can be integrated into the classroom. In 2000 the National Education Association “estimated that $268 billion is needed to bring the nation’s schools up to acceptable standards for basic issues such as plumbing, roof integrity, lighting, and safety” (McLaughlin and Bavin 28). In the presence of such a large amount needed for structural repair it is obvious that the costs of integrating media into classrooms must be considered. However, it is also important that the income levels of families in a school district should be considered as the classroom may be the only environment in which some children will be able to interact with media such as picture books or computers.

Currently the market for picture books is booming, yet “consumers, not schools or libraries, are the dominant market for children’s books in the United States” (Neuman et al. 17). In 1999, the overwhelming majority of children’s book purchases retailed $1.00 – $1.99, but this purchasing range was mainly composed of short paperback books bought by consumers (Neuman et al. 16). The average price for books purchased by educational institutions in 1999 ranged from “$6.00 – $9.99 with a sizable number of books purchased costing even more than $10.00 per book” (Neuman et al. 29). Susan Neuman and her colleagues hypothesize that this large difference in price may be attributable to the fact that schools “may choose to purchase hardback books, considering them more durable than paperbacks, and because so few books are likely to be purchased at one time, classrooms cannot take advantage of bulk buying discounts” (29). These higher prices leave many classroom and school libraries without the ability to buy many
books each year, especially since “even when libraries receive funds, the money
frequently goes toward computers and related technology rather than toward books”
(Brown). Despite such funding issues, the need for educational institutions to purchase
picture books is still strong. “Children’s access to books is highly variable; in low-
income neighborhoods, it may be difficult to impossible to find places to buy children’s
books even” (Neuman et al. 22). Hence, with the “declining growth in purchases for
libraries and schools, books may elude those low-income families who can least afford to
buy them and lead to a book gap between children from middle- and low-income
families” (Neuman et al. 21).

Although picture books can create a large purchasing bill, computer costs easily
surmount picture book costs. The actual computer unit costs hundreds of dollars yet the
price tag does not end there. Structural renovations may be needed to create new or
‘technology-compatible’ space for computers to be used. Once computers are bought and
set up the school must pay for Internet services and electric bills to keep the computers
online and running. Next, computer software must be purchased, technical support hired,
and security measures put in place. Ideally, training workshops are also held to show
teachers how to work the machines and integrate them into their curriculum (Healey 85-
88). In 2000, the National Education Association estimated that it would take $54 billion
to install and upgrade schools’ existing educational technologies in order for them to be
‘modernized’ (N.E.A.). Yet even if the money were available and all schools were
upgraded, in a few years the technology would be obsolete and either upgrades or new
systems would have to be purchased. Partially due to this continuing cost of school
computer use “schools primarily serving students of color and poor students continue to
have access to fewer computers and to less sophisticated computer equipment than do schools primarily serving more affluent students or white students” (Selfe 6). This disparity is creating what many are calling a ‘digital divide’ which will leave minority and low-income students behind while their more affluent peers have increasing access to computer technology.

**Combining Pictures and Text**

As a child’s brain develops from infancy to early childhood the dominant form of thinking and learning changes from visual to verbal thinking. As Carolyn N. Hedley and colleagues note:

> infant and early childhood learning is concerned almost exclusively with visual thinking. As language develops, its first function is that of naming categories within a visual field. Later on, the development of verbal thinking becomes a significant factor in our problem-solving capacity (Ellsworth et al. 116).

As they begin to learn how to read, children in the early elementary grades are in the course of transitioning between these two forms of thinking. From infancy they have been learning to understand the world through images while in the early elementary years they must begin using their visual knowledge of the world to understand the verbal code of print. This transition is made easier when the new verbal code they are learning is accompanied by visual images they are already accustomed to. Although visual and verbal thinking “can present a paradox to the learner….it is a paradox that is resolved by integrating the visual experience with the verbal one” (Ellsworth et al. 116). By presenting children with media formatted to integrate these two forms of learning, the
transition from the “more mosaic…holistic” visual thinking to more “linear, logical”
verbal thinking can be made much less difficult (Ellsworth et al. 110). Two media which
present such an integration are picture books and computers.

A picture book is a medium that truly integrates visual images with verbal
text. Innumerable variations of the text-picture relationship are possible in a picture
book. There is a “broad spectrum of word – image interaction reaching from ‘symmetry’
at one end to ‘contradiction’ at the other, with symmetry being, roughly speaking, an
equivalence of word and image, contradiction a maximal dissonance” (Lewis 38).
Despite the wide possibilities of picture-text ratio, most often the words in the book
present a linear narration of the story being told while the images help to “describe or
represent” some of the actions taking place (Nikolajeva and Scott 2). Young children
being read a picture book can often pick up on the events taking place in the story by
looking at the pictures and then learn all the smaller details from the text being read to
them. The pictures show children part of what is taking place in the story while also
allowing them to use their imaginations to fill in the rest of the story with their own
mental images. A picture book read-aloud therefore teaches children the important
verbal thinking and linear, narrative organization they need to learn in order to succeed in
school, while also allowing them to continue using the visual thinking they are already
comfortable with and expanding their imaginative capabilities.

Like picture books, computers also integrate visual images with text. In many
computer read-aloud software programs most or all of the text of a story is presented;
however, often the pictures themselves are the central point of interest for children.
Many software read-alouds present animated pictures in addition to the text being read although adding digitized pictures, sound, and animation to learning has not yet proven any more effective than studying illustrated books. Novice users of hypermedia tend to become easily distracted and confused by the lack of organizational structure (Healey 152).

Students using such software are therefore less likely to learn the linear, narrative organization or verbal thinking skills needed for academic success. Many computer software read-alouds allow children to click on some parts of the text to receive definitions of words or other information, however, this also leaves students without a “well-defined text, with a specified beginning and end, but with an open network where from any point a path can be specified” to reach a multitude of various other points (Ellsworth 50). Although the additional information provided by such features may first appear to be a useful educational tool, the lack of a well-defined narrative path negates most positive results as it does not teach students to use more linear verbal thinking. In addition, animated images make it less likely that students’ creativity or imaginations are being spurred as they are given more of the story through animation with “pictures made for them” without them needing to fill in as many or any details with their imaginations (Healey 211-212). Hence, although computers combine pictures and text in a fashion similar to picture books, there are subtle differences which make them less useful as part of a literacy curriculum.

Social Interaction
As previously discussed, a medium is “only as good as the teacher facilitating it” (Healey 87). Simply having picture books or computers in the classroom without the teacher facilitating time and activities for children to interact and engage with the media will not present students with academic or developmental gains (Healey 20). If children are not engaged with a medium, it is likely that they will not be interested in returning to it, especially if adults do not facilitate their interaction with it. Furthermore, researchers, such as Barbara Bowman of the Erikson Institute in Chicago, have found that “even in the age of technology, it is through relationships with others - through joint activities, language, and shared feelings with other human beings - that children grasp meaning” (Healey 213). This ‘grasp of meaning’ is needed before children can truly comprehend text and utilize it to communicate their own thoughts and feelings. Social interaction and true engagement with media are therefore needed in order to improve oral vocabulary and literacy skills.

Picture books utilized in teacher read-alouds present opportunities for increased social interaction. For instance, many studies have demonstrated that dialogic reading, those strategies that “include asking who, what, and when questions, then following children’s answers with questions, praise, and encouragement, improved children’s expressive language capabilities” (Neuman et al. 6). A similar research-proven technique which can be utilized to gain similar results is reciprocal teaching. This discussion technique is “built on four strategies that good readers use to comprehend text: predicting, questioning, clarifying, and summarizing” (Oczkus 1). Again it requires a child’s engaged interaction with an adult. Through either of these methods, student interaction with the teacher and peers will be increased, as well as student engagement
with the medium being utilized. Interactive read-aloud methods such as dialogic reading and reciprocal teaching “engage children to respond in a variety of ways to the story that has been read” (Campbell 1) and have been found to have “powerful effects on children’s language and reading skills in several studies” (Healey 232). Such cooperative learning techniques are also backed by the National Reading Panel as “effective teaching practices that improve students’ reading comprehension” (Oczkus 1). Since the Center for Early Reading Achievement makes the argument that “comprehension is the reason for reading,” the utilization of such methods during picture book read-alouds is a key tool in teaching emergent literacy skills (48).

Computer read-alouds do have some potential for increasing social interaction as well. Social interaction resulting from computer read-alouds is, however, mostly among peers sharing a computer (Snow 49). There is little potential for adult or teacher interaction when a computer read-aloud is utilized, as rarely do classrooms have the capabilities for a teacher to lead the class on a single computer (via a digital projector); and if multiple computers are used the teacher can only visit each computer for a limited amount of time. Although many software programs attempt to ‘replace’ or imitate interaction with an adult, various studies have shown that as of yet this is not effective. One such study cited by psychologist Robbie Case compared young children’s math learning from board games played on computers with the same games played by a child with an adult. Although the researchers thought they had developed a software package to duplicate the benefits of real-life experiences, the one-on-one contact with an adult still produced far greater gains. What was the difference? It was the spontaneous language interaction when the adult played with the child (Healey 214).
Although this experiment focuses on math learning, it is arguable that the same results would be found if the focus were on literacy learning. Technology today still cannot interact with a human as another human would. Computers can only respond to certain, set commands and in their responses they are not “especially warm and caring when it comes to children’s emotional and social needs” (Ellsworth et al. 21). When working on a computer students do appear engaged; however, this engagement is often more with the animation taking place on the screen than with the story that is being told. And even though computer programs are considered ‘interactive’ this interaction usually consists of “merely allowing the user to punch icons to choose the pace at which the story unfolds” rather than a form of interaction that is causing students to think critically or creatively about the story being told (Healey 151).

Many aspects of the format of a medium are therefore important to take into consideration when deciding which media will be utilized as part of a literacy curriculum. Spatial availability and financial limitations, along with the effect the medium’s combination of pictures and text and its ability to enhance social interaction and engagement with the medium should be considered before any purchases are made. The dollars in the educational budget and the hours in the school day are too few for any to be wasted on media that will not benefit student learning, especially literacy learning in the early elementary grades. Clearly, the evidence demonstrates that many factors must be considered before a medium is integrated into the classroom, however, it is important that we also remember the needs of the children behind the data.
Chapter 4

Observing the Children Behind the Data
Introduction

This study was designed to address the researcher’s interests in literacy achievement, children’s picture books, and curiosity about whether the current influx of computer software programs designed to enhance emergent literacy skills are truly benefiting children’s reading abilities. The study was constructed to allow not only the research of all three areas, but also a project that could compare the two media of picture books and computers as educational tools in a literacy curriculum. In an attempt to establish a control, the comparison will be made between picture book read-alouds and computer read-alouds so the act of singling out how the medium affects the attainment or enhancement of literacy skills is more possible.

Although there are many studies of methods for teaching literacy in the early elementary grades, there are few studies that specifically compare picture books with computers as media for use in a literacy curriculum. Furthermore, no studies could be located that specifically compared picture book read-alouds with computer read-alouds and analyzed their effectiveness in teaching or improving literacy skills in early elementary grades. Although the research on the use of both picture books and computers as instructional media in the classroom is lacking, this presents even more reason for the completion of this study.

The purpose of this study is to compare the effectiveness of teacher read-alouds using picture books and computer software read-alouds, on the acquisition of literacy skills in early elementary grades. Although this study is not extensive enough to determine definite answers, at its completion it will attempt to propose answers to the following questions:
1. Which medium appears to teach/enhance more literacy skills?
2. Which medium lends itself more to the enhancement of literacy skills?
3. What literacy skills does each medium appear to teach/enhance?
4. How do children interact with these media?
5. What role should each medium play in the early elementary classroom in regards to literacy instruction?

It is hoped that the completion of this study will help point the way for future research concerning emergent literacy while also providing first hand observational evidence for use in the researcher’s senior project.

**Materials and Methods**

In designing this study extensive research was carried out on the different methods of literacy instruction which are most accepted and believed to be most effective in teaching literacy skills. Next, lists of all the literacy skills these methods are working to enhance were created and cross-referenced in order to get a list of literacy skills which are backed by research and current educational theories as the most necessary for literacy achievement. For evaluative purposes, the skills were then grouped into three categories: Print/Phonological Awareness, Comprehension, and Social Context. These categories will act as the study’s evaluative criteria when the comparison between picture book read-alouds and computer read-alouds is made. The skills grouped into each category also act as evaluative criteria and are denoted as questions (see chapter 1) that the researcher will attempt to answer through observation and analysis.
Study subjects included students in a second grade classroom at Marshall Elementary School in Oxford, Ohio. The number of participants was determined by the class’s size, with 18 being the total number of students participating in the study. After collaboration with the classroom teacher, a time was found in the class schedule/curriculum which allotted an hour to an hour and a half when the study could take place. Next, a story was chosen which was available in both picture book and software form, and which the teacher felt was age appropriate for the students, but that they had not heard. The story chosen was a West African tale retold by Verna Aardema titled *Why Mosquitoes Buzz in People’s Ears*. For the first two parts of the study, half of the students (nine students) remained in the classroom to participate in either a computer read-aloud or the picture book read-aloud, while the other half of the students were moved to the school library to complete a class craft.

For the first half of the study, students were allowed to interact with a computer software program which presented a read-aloud of a ‘virtual picture book’ for about ten minutes. The computer read-aloud took place in the classroom on three classroom computers. Due to the small number of computers in the classroom, three students shared each computer during the computer read-aloud. The program was already set up to run when students were moved to the computer area. Students were told how to make the story move to the next ‘page’ (by clicking an arrow pointing right at the top of the screen) and then told they should go through all the pages to listen to the story. After the students heard the story, they were given a worksheet which asked them five comprehension questions about what they remembered from the story. The questions used were obtained from the class *Accelerated Reader Program* (see appendix for
comprehension worksheet). During this section of the study the researcher remained a background observer of the activity. Once all students were done filling out the worksheet the two halves of the classroom were switched, with the group that had used the computers moving into the library to work on the class craft while the other half moved into the classroom to listen to the picture book read-aloud.

The second half of the study was the picture book read-aloud. This read-aloud involved no media or tools other than a picture book, and was carried out in the manner that the teacher would normally present a read-aloud on any other day of the class curriculum. The picture book read-aloud took place in one corner of the classroom with the teacher sitting on a chair and students gathered around on the carpet. As with the computer read-aloud, after hearing the story students were given the same worksheet of five comprehension questions (see appendix for comprehension worksheet). During this section of the study the researcher again remained a background observer of the activity. Once all students were finished filling out their worksheet the other half of the class was brought back to the classroom from the library.

After both the computer and picture book read-alouds were done and students had completed the worksheets, the entire class was brought together for a discussion. At this point it was explained to students that they had all heard the same story and filled out the same worksheet, but half of them had heard the story through the computer and half had heard it read from a picture book by their teacher. Students were asked if they thought they would have liked to have been in the other group and, if so, why. Likewise, they were asked if they had a choice between having a parent read them a story from a picture book and hearing on one a computer which would they rather do and why. Student
responses were recorded by the researcher as comments and also in the form of whole class voting. The study ended with students discussing their favorite parts and characters presented in *Why Mosquitoes Buzz in People’s Ears*.

**Results**

During both the computer read-aloud and the picture book read-aloud student interaction with other students and with the medium being utilized was observed. For the computer read-aloud each of the three classroom computers was shared by a group of three students. Although working in a group, verbal communication was limited to brief comments about the story or concerning the computer controls. One of the three groups, group A, did not speak during the entire story. Another group, group B, spoke some, but mostly the communication centered around a conflict with the volume control which one student kept turning up while another kept turning down. The third group, group C, spoke about the same amount as group B, however, group C’s conversation was composed more of brief comments about the story (i.e. “oh, that’s sad,” “look at the lion,” etc.) with some comments concerning the computer use (i.e. “click on him,” “turn the page,” etc.). Most of the students watched the computer screen throughout the story much as they might watch a television screen; however, occasionally a child poked at the picture on the screen or looked around the room or at another computer during the story.

For the picture book read-aloud the entire group of nine students listened to the teacher read the story together. Student communication was limited with students mainly making comments about the story (i.e. “that’s true...he did,” “huh, he’s running past...
rabbit,” “I thought that…inaudible”). These comments were mostly directed towards the teacher or simply stated. Again students watched the teacher as though watching a television, although there was more movement and more facial expressions shown by the children in reaction to story events.

The scores for both the computer and picture book read-aloud groups are presented in the table below. As shown in the table the computer group had a wider range of scores obtained by students (ranging from 1/5 to 5/5 questions correct) than the picture book group (ranging from 3/5 to 5/5 questions correct). The difference in score achievements between the two groups does not appear significant, however, as the average score for both groups is still 4/5 questions correct. Due to the small size of the groups and the equivalent mean student scores, no further statistical analysis was carried out.

<table>
<thead>
<tr>
<th>Scores</th>
<th>Computer Group # of students with corresponding score</th>
<th>Picture Book Group # of students with corresponding score</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/5 Questions Correct</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>4/5 Questions Correct</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>3/5 Questions Correct</td>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2/5 Questions Correct</td>
<td>0</td>
<td>0</td>
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<tr>
<td>1/5 Questions Correct</td>
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</tr>
<tr>
<td>0/5 Questions Correct</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Average Student Score</strong></td>
<td><strong>4/5 Questions Correct</strong></td>
<td><strong>4/5 Questions Correct</strong></td>
</tr>
</tbody>
</table>

After the computer and picture book read-alouds had been completed a discussion was held with the entire classroom. In response to the question “do you think you would have liked being in the other group better” (i.e. in the computer group if they were in the
picture book group and vice versa), one student from the picture book group said she would have rather been in the computer group while six students in the computer group said they would have rather been in the picture book group. The main reasons given by the student wishing she had been in the computer group was that she thought it would have taken “less time to hear the story” and that sometimes it was “hard to hear the teacher” when she read stories. The reasons given by those wishing they had been in the picture book group were that they “didn’t have to hit the next button,” that their “computer messed up” during the story, and that their teacher had a “pretty voice and was the best storyteller.” In response to the question “if you were at home and you could choose, would you rather listen to a story with a computer or have your parents read you one from a picture book” all but one student said they would rather have their parents read a picture book to them. Reasons given were “you don’t have to push a button,” parents have “pretty voices,” parents “act out the story and make it funny,” and that the “computer breaks a lot.” The student that voted to use a computer said she “liked to play the games on it” and “it’s faster” than a parent reading the story.

Discussion

Although a small study, the results of this research present some interesting information and implications for further research. There was not a significant difference in the amount of verbal communication between the computer and picture book groups; however, the verbal remarks made by students in the picture book group received feedback from an adult while those in the computer group could only receive feedback
from a peer. This observation is significant when related to Lev Vygotsky’s social-constructivist model of learning. “According to this model, children actively construct their knowledge with the help of more knowing others” (David et al. 10). The picture book read-aloud presented children with a more knowing other whom they could ask questions of and learn from, while the computer read-aloud did not make this possible. Students in the computer group could ask questions of their peers; however, in the early elementary grades it is unlikely that a peer could provide the guidance an adult would.

The presence of verbal communication during both parts of the study is a positive characteristic for both the computer and picture book read-alouds. Verbal communication with adults and peers is important in the early elementary classroom as “spoken language vocabulary serves as a ‘scaffold’ in beginning reading” (New York State Education Department 28). Although the amount of verbal communication was limited in this study, it would be possible for a teacher to utilize a shared-reading method with a picture book read-aloud in which “print-referencing strategies, such as pointing to print or commenting on print” are used (Ezell and Justice 36). Such methods of shared-reading also enhance the “proportion of teacher and child talk during reading” through “analysis of characters or events, predictions of coming events, and discussion of vocabulary (e.g., definitions, comments about sounds or functions of words)” and have been found to be “significantly associated with a higher level of children’s vocabulary and story comprehension” (Lonigan and Whitehurst 264-265). The computer read-aloud did present the possibility of a similar method of learning for students, as it had some words highlighted in blue that could be clicked on to see other words with the same meaning and some words highlighted in pink which could be clicked on to hear a short
rhyme defining the word. However, during this study none of the children realized that this could be done and hence the feature did not work to enhance student interaction with the story. Therefore, it is not known if this feature would have increased the amount of verbal communication among the groups working on the computers.

As can be seen in table one there was no significant difference between comprehension scores received by the computer and picture book groups. Both groups received a mean score of 4 out of 5 questions correct on the comprehension worksheet. There was slight variation in the range of scores received by each group; however, the group sizes were too small for this to accurately portray any correlation between the scores received and the medium. Hence, from this study no conclusion can be drawn about the effect the medium may have on student comprehension specifically.

At the conclusion of the study the entire class was brought together for a discussion about their experience with computer and picture book read-alouds. After being told what the other group had done, students were asked if they thought they would have rather been in the other group. Only one child wished she had been in the computer group while two-thirds of the children in the computer group wished they had been in the picture book group. Furthermore when a vote was taken on if they would rather have a parent read a picture book to them or have a computer read a story to them, all but one child said they would rather have a parent read a story to them. It is interesting that in such a technology-saturated society these children whom have grown up in the era of home computers, televisions, and video games would choose the more ‘traditional’ picture book read-aloud over a computer read-aloud. These results point to the fact that when an adult reads a picture book to a child or a group of children there is much more
going on than just the transfer of a story; there is human interaction which even the most
advanced technology today can not imitate fully.

Another point brought up by students during the class discussion was a result of
the small number of classroom computers available. Only three computers were
available during this study so students were divided into groups with three students
sharing each computer. In each group one student sat at a chair directly in front of the
computer and used the mouse to click for each page of the story to turn, while the other
two students stood or sat in chairs behind and to the side of the first student. Students
who were not in control of the mouse during the story felt they “didn’t get to do it” and
had not even really gotten to hear the story. There was clear disappointment for some
students when they were brought back to the table to fill out the comprehension
worksheet because they felt left out of the activity. However, those children who listened
to the picture book read-aloud all appeared to enjoy the story and none reported feeling
that they had not been a part of the group. Hence, although in both situations students
were in groups sharing the medium through which the story was being told, and those in
the picture book group were sharing the medium with eight other students rather than
two, it appears that only the children who physically interacted with the computer felt
they were a part of the activity.

The students’ preference of a picture book read-aloud over a computer read-aloud
and feelings of not being a part of the activity in the computer read-aloud again relate
with Lev Vygotsky’s social constructivist model of learning. Although some may argue
that the computer could also act as the ‘more knowing other’ in this model of learning,
many studies have shown that it is nearly just as important to have human interaction as
part of a student’s learning. One such study carried out by Betty Hart and Todd Risley in 1995 analyzed the “language and achievement differences between advantaged and disadvantaged children, and differences in their early experiences” and concluded that children’s IQ was less correlated with vocabulary size than aspects of parent interaction (Biemiller 14). Adult interaction in this study was evaluated with the categories of:

(a) different words per hour, (b) feedback tone or warmth of interaction, (c) ‘symbolic emphasis,’ (d) ‘guidance style’ (directive vs. suggestive), and (e) ‘responsiveness’ (proportion of parent responses to child-initiated talk), (Biemiller 14)

Although today’s technology could enable a computer read-aloud to alter its tone, symbolic emphasis, or the words a child was presented with, there are clearly things that computers still are not able to do. For instance, we have yet to see a computer that can present a student with the same warmth that human interaction provides or that can be truly responsive to a child’s questions or remarks. Furthermore, although this study was small and had many limitations, the nearly unanimous student preference for a read-aloud with a parent or teacher demonstrates the importance this interaction has not only in relation to the scores or results found in research, but for the child behind the data.

Clearly, this study had many limitations which must be recognized. A few limitations could not be avoided due to limited classroom time for a study to take place. Although the study was done with an entire classroom, when broken in half the groups were far too small to gather reliable data. Future studies would best be done with either a larger class or multiple classrooms. Another limitation for the data was the length of the study. The data gathered cannot demonstrate a clear correlation between the media and literacy skill enhancement or learning, since the study was carried out only once with no
follow-up testing. Future studies would provide more reliable data if they were carried out over an extended length of time. Furthermore, the group size in which the students listened to the computer read-aloud was dictated by the number of computers available for classroom use. Although this restriction reflected the realistic limitations of classroom resources, future studies might be better served if a computer lab or other area where students could work on a computer individually or in pairs would be accessible. Hence, future research should take these limitations into consideration.

Although the data collected in this study cannot give clear answers for correlations between the media and literacy skills, they do point to many venues for future research. Taking the limitations discussed above into consideration, another study of the same format performed with a larger participant group and over a longer period of time would be very useful in collecting data that could demonstrate if the medium of a read-aloud truly contributes to literacy skill enhancement during early elementary school. Furthermore, a similar study in which the student interacted with a picture book or computer individually might also provide useful data concerning the effectiveness of media format in enhancing or teaching literacy skills. A study that focused on only one or two specific literacy skills may also help in identifying if one medium might enhance some literacy skills while the other medium could enhance other skills. Likewise, the study might also be reproduced utilizing an ‘interactive’ book rather than a computer program for comparison with an adult or teacher picture book read-aloud. Future studies may also be well served to test student learning styles before commencing the actual study and then analyzing which styles work best with which medium formats. Research performed with a larger participant group and over a longer period of time should present
ideas for what role different media should play in a classroom and how various media may work together as part of a well-balanced literacy program that caters to different student learning styles.
Conclusion
As technology advances, every aspect of American culture is becoming saturated with new gadgets and gizmos, with many blindly accepting that anything that is ‘cutting edge’ will reap the most results. Yet when it comes to our children’s education we must take the time to understand the pros and cons of a medium before placing it in classrooms. Many parents think that the earlier a child can begin working with a computer, the better their chance of excelling in the future; however, the generation of ‘cyber tots’ which are now moving into the classrooms are finding it difficult to transition into the linear, verbal thinking and language abilities needed for success in the classroom (Healey 231).

The research concerning computers’ role in education is lacking, yet that which is available demonstrates that computers are not the best medium for teaching young children literacy skills. Computer read-alouds do not appear to enhance students’ print and phonological awareness, reading comprehension, or social interaction. Spatial and financial limitations can make it very difficult to integrate computers into classrooms, and many computers that are integrated are utilized mainly for student play during recess and study halls (Healey 93). Furthermore, computers make it difficult or impossible for students to have true interaction with an adult. This lack of adult interaction not only goes against Vygotsky’s theory of social constructivism, but also against many recent studies including the observational study presented in this paper. Students not only value time spent with adults, it has been proven time and again as a key element in teaching children literacy skills.

It is true that almost any time an advancement or creation of a new technological medium is introduced it is often met with some form of criticism. Throughout the history
of educational institutions, new technologies have been introduced into the classroom to find some faithful supporters and critics, yet through all the new technologies the classroom has always returned to center around the book. This is because not only research and theory, but also hundreds of years of practice has demonstrated that children can reap great benefits from books. Books present a tried and true mode of information, instruction, and enjoyment.

In designing an effective literacy program it thus makes sense that children should first be taught with books. This is especially true since there is a small developmental window during which children can learn natural languages best while “computer languages have no critical period and can be learned at any age” (Healey 231). Children who do not master literacy skills during their early childhood are destined to always be at a disadvantage. Furthermore, literacy skills do not change or become outdated with the passing of a few years. Hence, it is most beneficial for students to have their classroom time focused on the attainment of literacy skills during the early elementary grades, so they may later be able to read what is on a computer screen to learn the computer skills that are becoming more and more needed in today’s society.

It is important to note then, that this is not an ‘either-or’ argument. It is not being argued that children should not learn computer skills or that computers do not have any place in the classroom. Rather, it is believed that computers are simply not the best medium for teaching literacy skills in the early elementary classroom. There is no denying that computer skills are needed in today’s society and that they can be useful in teaching some skills to children. More research is needed to understand what a computer’s best role in a classroom is, however, the little research that is currently
available points to the use of computers with older students in teaching more advanced educational skills.

Just as a parent who is trying to provide their growing child with the most nutritionally-balanced diet would never restrict that child to eating foods from only one food group, we should not restrict children to only learning through one medium throughout their educational careers. However, a parent knows that even though variety is desired there are certain times that some foods are best consumed; hence, a dessert may be allowed after dinner rather than before. Likewise, computers should be utilized in the classroom after a child has mastered the basic skills of literacy and not before. It would be ignoring the needs of today’s society to have children not learn computer skills at some point in their education, however, first they must master basic print literacy to be truly successful in our culture. Therefore as parents and educators we need to first help our children master the picture book before we move them on to the computer screen.
Glossary

**Accelerated Reader Program** – “reading management software” designed for classroom use as a way to “monitor all forms of guided reading” ([www.renlearn.com/ar/overview/default.htm](http://www.renlearn.com/ar/overview/default.htm)). Used in many classrooms as a way of meeting state educational standards. A child reads a story listed as an ‘accelerated reader book,’ after which they log on to a classroom computer and take a short comprehension quiz. All student results are recorded online for the teacher to monitor.

**Balanced Early Literacy Program** – A program developed and utilized to teach literacy which should include strategies to teach phonemic awareness, vocabulary development, comprehension strategies, reading motivation, familiarity with good literature, critical thinking, and the writing ability to convey meaning to different audiences and utilize “activities to promote motivation to read as well as oral and written language development” (New York State Board of Education 17, 23).

**Book Gap** – the concept that those of a low socioeconomic background have little access to print materials growing up (while their more affluent peers have greater access) which causes a gap between their immediate and long-term literacy achievement and their more affluent peers’ achievement (Neuman et al 3).

**Book Handling Skills** – Skills and insights into how to physically interact with a book including abilities such as “identifying the front and back of the book, top and bottom of a book, turning the pages one at a time, moving from left to right, as well as appreciating and respecting books” (Jalongo et al. 168). Are the most basic skills associated with print awareness (see definition below).

**Chapbook** - “a small book containing ballads, poems, tales, or tracts” (Merriam Webster Online); inexpensive stories carried throughout towns by peddlers and sold to those who could read (Hazard 30); geared towards adult readers, yet appealed to children before children’s literature was altered to appeal to children.

**Children’s Books** – a term interchangeable with the terms ‘children’s literature’ and ‘picture books.’ See children’s literature and picture books for further explanation.
**Children’s Literature** – those books geared towards a child’s reading ability and designed in a way that will appeal to a child’s interests; an overarching term which includes texts geared toward many different levels of reading ability; can range from text only to text and illustration to illustration only. See definitions of varying forms of children’s literature under exhibit book, illustrated book, picture book, and picture narrative.

**Cognitive Capacity** – The amount of ‘brain energy’ or cognitive energy it is theorized that humans have to devote to a particular task (Nathan and Stanovich 176).

**Comprehension** - The “act or action of grasping with intellect; understanding” (Merriam Webster Online). The “ability to answer reasonable questions about a passage one has heard or read” in regards to the meaning it denotes (Biemiller 6).

**Computer-Assisted Instruction (CAI)** – in this context, computer software designed specifically to aid in teaching certain educational skills.

**Computer Lab** – in this context, a room located in a school where many or all of the computers available for student and teacher use are kept. Ideally this lab is run by a faculty member trained to work with computers, however, sometimes the labs are merely run and supervised by the teacher of the class which is using the computers at that time.

**Computer Network** – “two or more computers that are connected together to share resources, such as hardware, data, and/or software. A network that covers a small geographical area, such as a room or a building, is called a local area network or LAN” (www.menominee.nsn.us/MIS/Pages/MISGlossary.htm).

**Computer Read-Aloud** – a computer software program which allows a child to follow along with the text from a child’s book or story while the computer ‘reads’ the text of the story. Often includes visual and interactive components and can be utilized alone or in a small group.

**Conceptual Knowledge** – In the context of learning vocabulary: the understanding of “how the word’s meaning adapts to different contexts” (Stahl 25). Must be accompanied by definitional knowledge (see definition below) before a word can truly be ‘known’ and accumulated into one’s vocabulary.
**Cumulative Vocabulary Deficit** – A deficit which begins as a difference in the oral vocabulary (see definition below) knowledge a student has when they enter pre-kindergarten or kindergarten. This deficit continues to grow larger and larger as they move through each elementary grade because “restricted vocabulary makes it harder to add new vocabulary and probably leads to reduced amounts of reading…which in turn continues to restrict vocabulary development” as reading fluency (see definition below) cannot be gained (Biemiller 26). Hence, the deficit continues to accumulate throughout a child’s educational career.

**Definitional Knowledge** – In the context of learning vocabulary: the “knowledge of the logical relationship into which the word enters such as the category or class to which it belongs” (Stahl 25). Must be accompanied by contextual knowledge (see definition above) before a word can truly be ‘known’ and accumulated into one’s vocabulary.

**Dialogic Reading** – “reading which differs substantially from the manner that adults typically read picture books to children. A shift of roles is central: In typical book reading the adult reads and the child listens, but in dialogic reading, the child learns to become the storyteller. The adult then assumes the role of an active listener, asking questions, adding information, and prompting the child to increase the sophistication of his or her description of the material in the picture book (see definition below). As the child becomes more skillful in the role of the storyteller, the adult is encouraged to ask open-ended questions and avoid yes/no or pointing questions. For example, the adult might say, ‘what is Eeyore doing?’ or “you tell me about this page’ instead of ‘Is Eeyore lying down?’” (Whitehurst et al. 680)

**Dialogic Reading Strategies** - those strategies which “include asking who, what, and when questions, then following children’s answers with questions, praise, and encouragement;” shown to improved children’s expressive language capabilities” (Neuman et al. 6).

**Digital Divide** – similar to the Book Gap (see definition above). The concept that there is clear disparity between the access and quality experiences low-income children have with computers at school in relation to their more affluent peers (Becker 45); the “gulf between people who operate in the digital world and those who do not have access” (Snyder et al. 242).

**Emergent Literacy** – “acknowledges the importance of children’s attention to the varied uses of print in the environment. It emphasizes the continuum of language growth
from oral language through mastery of reading and writing and focuses on what children themselves do to become literate” (Salinger 13-14).

**Exhibit Book** – “a picture dictionary with no narrative” (Nikolajeva and Scott 6); usually geared towards younger children; defined by some as a picture book but others as a separate form of children’s literature.

**Graphemes** – Written letters that represent the verbal phoneme sounds (see phoneme definition below).

**Illustrated Book** – a story which has illustrations however the “text can exist independently” of these illustrations without the story losing valuable information or meaning (Nikolajeva and Scott 6).

**Instrumentalist Hypothesis** – Hypothesis that “knowledge of words causes readers to comprehend text” which presents two implications for teachers 1) “if word knowledge helps people to understand texts, then texts with more difficult words would be more difficult to understand” and 2) teaching word meanings should improve comprehension” (Stahl 5).

**Interaction** - a “mutual or reciprocal action or influence” (Merriam Webster Online); for the purposes of this paper use of the term ‘interaction’ will also entail a form of engagement which an observer should be able to view. A media which engages a child should “hold the attention” or “induce the participation” of the child (Merriam Webster Online).

**Limited Cognitive Resource Theory** - Argues that “humans have only so much cognitive capacity to devote to a particular task” (Nathan and Stanovich 176). Utilized in the context of literacy through the rationalization that by using less cognitive energy on word recognition (see definition below), more energy is available to comprehend (see definition of reading comprehension below) the text being read.

**Listening Comprehension** - The ability to understand text that is heard and “answer reasonable questions” about it (Biemiller 6). On average this ability “begins to develop around twelve months of age and continues to grow long after grade 6” (Biemiller 3).
Listening Vocabulary – The “words we need to know to understand what we hear” (Center for Early Reading Achievement 34).

Literacy - The ability to read and write with competence. “Includes all the activities involved in speaking, listening, reading, writing, and appreciating both spoken and written language” (Armbruster et al. 59). Signified as print literacy when discussed in the context of multiple literacies.

Mainframe Computer – one of the earliest computers used during the 1940s through the 1960s by large businesses. One mainframe filled an entire room and could only complete one or two tasks at a time.

Microcomputer - an older term for a smaller computer which became available in the late ‘70s and early ‘80s. The equivalent to today’s desktop computer or personal computer (PC).

Narrative Comprehension – In this context, the comprehension of basic story structure and the components inherent in it (such as beginning, ending, sequence of events, etc)

Oral Vocabulary – Consists of the “words that we use in speaking or recognize in listening;” a combination of listening vocabulary (see definition above) and speaking vocabulary (see definition below) (Center for Early Reading Achievement 34).

Phonemes - “the smallest part of spoken language that makes a difference in the meaning of words” (Center for the Improvement of Early Reading Achievement 4).

Phonemic Awareness – The “ability to notice, think about, and work with the individual sounds in spoken words” (Center for the Improvement of Early Reading Achievement 2). A subgroup of phonological awareness (see definition below)

Phonics Instruction – Method of instruction that “teaches children the relationships between the letters (graphemes) of written language and the individual sounds (phonemes) of spoken language….how to use these relationships to read and write words….and a system for remembering how to read words” (Center for the Improvement of Early Reading Achievement 12).
**Phonological Awareness** – The “understanding that oral language is made up of sounds or groups of sounds” (Allor and McCarthen 73). Considered a more general category which refers to the ability to “distinguish sounds in the everyday environment” (New York State Education Department 21).

**Picture Book** – a unique “art form based on the combination of two levels of communication: the visual and verbal” (Nikolajeva and Scott 1); often differentiated from illustrated children’s literature or exhibit books (see definition above) by the equal balance of text and picture importance to the understanding and enjoyment of the story (Nikolajeva and Scott 6); often can be enjoyed by adults and children and many are “clearly designed for both small children and sophisticated adults, communicating to the dual audience at a variety of levels” (Nikolajeva and Scott 21).

**Picture Book Read-Aloud** – fairly interchangeable with the term teacher read-aloud. Denotes that the medium being utilized is a picture book, however leaves the human descriptor out so it can refer to any person reading aloud (i.e. teacher, parent, relative, other caregiver, older sibling, etc).

**Picture Narrative** – a picture book which is “wordless or with very few words” (Nikolajeva and Scott 6).

**Print Awareness** - An “understanding of certain basic insights and observations about the forms and functions of print” (Allor and McCathren 74). Includes book handling skills (see definition above) along with other insights that demonstrate understanding that “print corresponds with speech,” ‘differentiating between pictures and words,’ and how ‘empty space establishes word boundaries’ (Allor and McCathren 74).

**Read-aloud** – “the worldwide phenomenon of an adult reading a book to a young child or group of children (Campbell 1). Can be referred to as a teacher read-aloud, picture book read-aloud, computer read-aloud or with other descriptors depending on the method/medium being used. (See teacher read-aloud, picture book read-aloud, and computer read-aloud for further differentiation).

**Reading Comprehension** – “Intentional thinking during which meaning is constructed through interactions between text and reader” (National Reading Panel 14). On average this ability “begins to develop in kindergarten or first grade” (Biemiller 3). Some also utilize the term *text comprehension* to connote the same ability.
**Reading Fluency** – “The ability to read connected text with appropriate speed, accuracy, and expression” (New York State Education Department 17).

**Reading Vocabulary** - The “words we recognize or use in print; the words we need to know to understand what we read” (Center for Early Reading Achievement 34).

**Reciprocal Teaching** - a discussion technique which is “built on four strategies that good readers use to comprehend text: predicting, questioning, clarifying, and summarizing” and requires a child’s engaged interaction with an adult (Oczkus 1).

**Referent Connections** – Mental connections between a listener or reader’s background experience and information, and the object or concept to which a ‘word sound’ refers (Biemiller 12). Must be created in order for a word, in terms of its definition or meaning, to be understood, learned, and remembered. Theoretical background is the schema theory (see definition below) proposed by Jean Piaget and widely accepted in educational psychology.

**Schema Theory** – A cognitive theory proposed by Jean Piaget, educational and developmental psychologist, which states that “all human beings possess categorical rules or scripts that they use to interpret the world. New information is processed according to how it fits into these rules, called schema. These schema can be used not only to interpret but also to predict situations occurring in our environment. Information that does not fit into these schema may not be comprehended, or may not be comprehended correctly….however, the learner in schema theory actively builds schema and revises them in light of new information” so new information is continually being integrated into one’s knowledge of the world around them (Widmayer 1). A foundational theory widely used and referenced in educational psychology.

**Shared-Reading Method** – A method in which adults interact with a text by “pointing to print or commenting on print,” (Ezell and Justice 36-37) while also enhancing the “proportion of teacher and child talk during reading” through “analysis of characters or events, predictions of coming events, and discussion of vocabulary (e.g., definitions, comments about sounds or functions of words)” (Lonigan and Whitehurst 264-265).

**Speaking Vocabulary** - The “words we use when we speak” (Center for Early Reading Achievement 34).
Social-Constructivist Model of Learning – Proposed by respected theorist Lev Vygotsky, this theory proposes that “children actively construct their knowledge with the help of more knowing others…hence, learners are interdependent” (David et al. 10). The model stresses the importance of adult interaction in the learning process through “the adult’s attention to what the child is trying to learn, what might be the next step in that learning, and how the adult can present the learning experience for the child to access” (David et al. 24).

Teacher Read-Aloud – the method of storytelling in which a teacher reads a story aloud to a group of students (most often a group but may be a single student). Often utilizes a picture book as the medium the story is read from.

Verbal Thinking – “promotes linear, logical thinking useful in the achievement of educational tasks involving reading and writing” (Ellsworth et al. 110); is developed after the achievement of visual learning/thinking (see definitions below); and is “a significant factor in our problem-solving capacity” (Ellsworth et al. 116).

Visual Learning – learning through visual stimulation from icons, pictures, and symbols. Promotes visual thinking (see definition below).

Visual Thinking – “more mosaic, more holistic, and more complex [than verbal thinking (see definition above)] and promotes different orders of complex thinking” (Ellsworth et al. 110); “develops imagination and creativity; encourages a departure from the linear logic of print; elicits emotions and feelings as a kind of ‘language of emotion;’ and fosters cultural values and socialization” (Ellsworth et al. 121).

Vocabulary – The “words we must know to communicate effectively; can be described as oral vocabulary or reading vocabulary (see separate definitions above) (Center for Early Reading Achievement 34). To increase one’s vocabulary one must acquire definitional and contextual knowledge (see definitions above) about the words being added (Stahl 25).

Word Recognition – The ability to decode letters and words on a page in order to draw meaning from them (Nathan and Stanovich 176). Requires large amounts of cognitive capacity (see definition above) and is not considered to be fluent reading until it becomes an automatic process.


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Appendix

Comprehension Worksheet

Why Mosquitoes Buzz in People’s Ears

1. Iguana stuck sticks in his ears after the mosquito said she -------
   A. had seen a farmer digging yams almost as big as she was.
   B. had frightened away a lion that was as big as King Lion.
   C. was going to buzz around his ears.
   D. had flown faster than Mother Owl.

2. When the iguana did no answer him, the snake thought the iguana was -------
   A. plotting mischief against him.
   B. teasing him.
   C. running away from danger.
   D. feeling too sick to talk.

3. Why did the monkey leap “kili wili” through the trees?
   A. He wanted to find King Lion and ask him for advice.
   B. He wanted to find Mother Owl and tell her than one of her owlets was sick.
   C. He thought there was danger and wanted to warn the other animals.
   D. He was trying to show off in front of another monkey.

4. Why didn’t Mother Owl hoot and wake up the sun?
   A. She was angry with the other animals for not inviting her to the meeting.
   B. She was too tired to hoot because she had been awake all night.
   C. She was too sad to hoot because her owlet was dead.
   D. She feared that the python would hear her hoot and kill her.

5. Mother Owl was satisfied and woke the sun up after the -------
   A. lion declared that nobody had truly been at fault.
   B. mosquito said she was very sorry.
   C. animals cried for mosquito to be punished.
   D. other owlets laughed at the mosquito’s joke.

CORRECT ANSWERS: 1-A, 2-A, 3-C, 4-C, 5-C

Questions adapted from: