

There is No Magical, Miracle Pill

Language is born in human relationship

Those who think of language as simply a self-contained set of signs linked to sounds ignore the essential third element, the human being who must make the linkage between them if there is indeed to be a meaningful word. Language is socially evolved, but it is always constituted by individuals, with their particular histories.

Louise Rosenblatt 1995

Nate's blonde hair is trimmed into a neat crewcut. His hazel eyes are rimmed in long dark lashes. His smile is infectious. His grin is full of the too-large permanent teeth so characteristic of third grade. When he laughs, his sharp cheekbones make his eyes dance.

It is morning recess. Nate has joined a dozen other boys to play wall ball with a tiny blue rubber handball. He runs into the game. Boys scurry, dodge, and chase the blue ball as it thumps against the cinder block wall. Shouts of laughter bubble up from the clump of children. Nate stays in the thick of the game even when he is 'pegged' by the holder of the ball. He dashes to the wall. He is *IT*. He puts himself at the mercy of the wall ball in a good natured, sportsmanlike way. He is graceful and sure of his footing. A lull in the game fills with teasing and laughter as boys hunt through the shrubs for the stray blue ball. The recess whistle blows and ends the wall ball game. Nate reluctantly drifts into line along with his classmates. As the line leader, he steps right into his privileged position in front of all the other children. His expression reads his delight with being close to his teacher, and he slips his hand into hers before the line has begun moving. The two of them whisper together so that other children in the line are not really certain of their talk. This teacher knows Nate very well after sharing 3 years of his life. He is fully, completely devoted to her. Their quiet discussion starts and stops, starts and stops as the line of children snakes along to the classroom.

The line of children stops at a red brick cottage with the number 29 on the outside of the door. This is where Nate and the other children who are part of his multiage family of first, second, and third graders live and learn. The front wall of this cottage is rimmed by a flower bed that the children have planted and tended. A picnic table is under a large tree in front of the cottage. A long porch spans the entrance of the cottage. A mailbox planter painted with tiger paw prints sits at the doorway waiting for delivery of hand stamped mail from other children around the school. A work

table and student chairs are on the porch. A white dry erase board with fresh crisp announcements and smears from old notes hangs on the wall of the porch. The warmth of the cottage invites a closer look.

Inside, the cottage is a visual feast. The room overflows with the art and the writing of these children. A banquet of books lures the children to read. Open front bookshelves display picture books whose covers call to the children. Class made books have their special space in these shelves too. Revolving turnstiles primly hold author sets and chapter books. Open crates of books grouped by theme line the floor. A bulletin board devoted to the children's poetry sings out "Poems are like dreams for your imagination". A huge whiteboard on an easel and magnetized word pieces are haphazardly scattered under this bulletin board. A reading loft with pillows, stuffed animals, and a listening center fills a corner of the room. It invites children to come away into its quiet rest. This place is crowded with the work and the materials for children to be productive readers, writers, and thinkers.

Nate says that he loves writing stories. His favorite time in the school day is project time when he can read or write or build anything that he wants. He chooses to write stories; stories about UFO's, Martians, the Bermuda Triangle, and Bigfoot. His imagination is captured by these mysteries. He writes with his buddy, Stetson. Nate makes up the story and Stetson writes it all down. Then, together, they draw elaborate cartoonish illustrations for their books and read them to the entire class from the author's chair. Nate is an imaginative, creative storyteller. He says he is always thinking up lots of ideas for stories. He wants to be a cartoonist and an animator when he grows up.

However, Nate's Individualized Education Plan (IEP) reads that his **"general cognitive ability was in the low average range"**. It reads: **"Comprehending verbal information and using verbal abilities to solve new problems are weaknesses."** And **"processing visual material quickly is also an ability that Nate performs poorly compared to his nonverbal reasoning ability."** In overall reading skills Nate performed in the below average range. He performed comparably on tasks that required him to match sounds and printed words to corresponding letters and pictures and to read sentences and answer questions about what he read. The diagnosis: A moderate expressive language delay in the presence of severe receptive language delay. Nate is a special education student. A multidisciplinary committee has convened and determined that Nate is somehow different "beneath his skin, and between his ears" (Mehan, 1989). His IEP says he learns differently than his wall ball team. His IEP says he learns differently than Stetson does. He leaves the cottage to learn language in another classroom in this school. In that room, Nate does not write stories and comic strips. His classmates do not sit on the floor around his feet to hear the next chapter of his UFO book. In that room, Nate does not explain to his peers where he gets his writing ideas, or how he came up

with the illustrations. Because his IEP says he has a language delay, he leaves his books about UFOs and Martians and his stories to go to another room to learn language.

Nate sits at a computer in this other room for 100 minutes every day. He puts on headphones so that the real sounds and talk of elementary school are silenced. Alone at a computer, Nate plays one of seven individual training exercises in the Fast ForWord language program. He plays the game *Circus Sequence* that gives him two sound sweeps of pre-word phonemes on a circus tent screen which he must match. Or he plays *Old Mac Donald's Flying Farm* where the object of the game is to capture flying animals that make a single syllabic noise in rapid succession. Some days Nate completes an electronic worksheet called *Phonic Words* to match pictures and words. For 100 minutes every day for the next 8 weeks, Nate plays with bits of sound and single words so that his auditory processing, visual-word recognition, sound-letter recognition improves. His syntax, morphology, and higher level working memory and expressive language skills improve as well. Nate will receive toys and candy and gum and stickers during the 100 minutes because “motivational activities have a critical effect on compliance with the Scientific Learning training protocol. And compliance has been shown to be a primary factor in determining the benefit that participants receive from Scientific Learning training programs” (Scientific Learning, 2000).

Background Description of the Study

This work began in the fall of 2000 when the principal of this elementary school arranged for some faculty release time to participate in a day-long training session sponsored by Scientific Learning Corporation of Berkeley, California. The company was piloting a cutting edge technology, the Fast ForWord program, on our elementary school campus and was providing a “scientific learning training seminar in the brain basics” that underlay the technology. I had encountered the controversial neurological theory of Neural Connectedness that undergird this technology in my doctoral studies. The claims and appeals made during the course of the training included: *one to two years growth in just four to six weeks; synaptic connections redriven in the temporal lobes of the brain; improvement in rate of language processing, higher-level working memory, strengthened grammar and syntax, and increased attention to task all based in the neuroscientific research of a team of renowned scientists* (Scientific Learning, 2000). It seemed magical; a miracle.

The school principal requested follow-up on the Scientific Learning pilot program with workshop sessions for classroom teachers and the parents of the children who had participated in the study. The principal wanted to be assured that everything possible was accomplished to provide for the success of the pilot. She wanted intense follow-up to continue through the spring including observation data on the transition of the Fast ForWord participants into the next grade level in the fall. What happens as the children in the pilot study return to their classroom settings after the Fast

ForWord intervention? What happens around the children at home? How do others around the children understand this intervention? What would the transition to other classrooms be like for these children? Nate caught my attention. Nate's language development had been late. He had been selectively mute in his earliest years. All the ingredients for building literacy seemed present in Nate's life, yet he had continued difficulty with learning to read and write.

Literacy Construction

Much of the work in emergent literacy theory has assumed that children follow a continuous, successful route to literacy acquisition. Emergent literacy theory focuses on the activity of the child in constructing literacy, the complex and unique aspects of each child's individual development, and the role of adult scaffolding in literacy development. Within the Social Interactionist perspective of literacy acquisition, children from cultural and social contexts different than the culture of schools are mismatched. Children growing up in diverse cultures and settings are clearly at a disadvantage between their "community ways" of using language and "school" use of language and literacy (Heath, 1983; Ferreiro and Teberosky, 1982). However, accounting for lags and discontinuities in literacy development of children from typical, middle class "ways" of acquiring literacy within the Social Interactionist perspective is problematic. When children with language and reading difficulties are privileged to be surrounded by dialogic oral languaging, print rich experiences, regular lapreading and bedtime story rituals, when they have wonderfully complex school experiences with informed, reflective teachers in ideal settings, and when they can freely choose from a range of print materials and modes of expression in the classroom, how can the discontinuities be explained? How is it that the 'natural' process of learning language in a literate environment has not provided the meaning-based structures for decoding and recognizing unfamiliar words?

The Cognitive-Developmentalist perspective of emergent literacy views reading and writing as asynchronous, discontinuous processes (Frith, 1985; Ehri, 1994). Within this perspective, language development occurs in "stages" or "phases" or "cutting edges" of development. Children's thinking and construction of literacy within each stage is qualitatively different than the previous stage. Difficulties in acquiring written language are attributed to a failure to transition from one level of literacy to the next. Frith (1985, 1986) speculates that dyslexics and language delayed children are unable to transition from the logographic phase of reading that relies heavily on context and simple, visual association to the more complex alphabetic phase where the relationships between letters in the print and graphophonic knowledge undergird reading. Over time, the dyslexic reader develops a strategy of contextual guessing and memory retrieval without actually decoding of words. The alphabetic code is unbroken and a mnemonic cueing system is internalized for the readers to retrieve whole words from memory. It is a slow, laborious, compensatory strategy.

The Behavioral Science, 'scientific research based' method of literacy acquisition focuses on reading and writing as the product of decoding an alphabetic language such as English. Spellings are viewed as sequentially, systematically, and regularly representing spoken words. The initial stages of reading development are learning phonemic awareness, learning that words are comprised of individual sound parts, acquiring phonics skills, and linking the sound with letters, not of learning language in a natural process. The strategy of choice for beginning readers within this perspective is to map letters to sounds in an increasingly complete and accurate manner (Adams, 1990; Foorman, et al., 1998). Direct, systematic, explicit instruction in alphabetic coding facilitates reading acquisition.

The most recent findings in neurobiology posit neurobiological, functional disruption in the organization of the brain as an alternate explanation for dyslexia and failure in written language (Shaywitz, Shaywitz, Pugh, Fulbright, Constable, Mencl, Shankweiler, Liberman, Skudlarski, Fletcher, Katz, Marchione, Lacadie, Gatenby & Gore, 1998). Children who are unable to read well are believed to be impaired in the occipito-temporal region of the brain. This region of the brain is involved in reading phonetically according to magnetic resonance imaging data. An alternate brain region serves as a backup system for reading as the dyslexic child matures. The backup brain systems cannot process printed information as easily as can the brain systems primarily involved in reading. The backup systems do not allow dyslexic children to "hear" the segmented phonemes and sound structure of spoken language. The child must be directly taught to break apart spoken words into smaller sound segments and to map these phonemes to printed words on a page. With this explanation of language difficulties, instruction and intervention must be made directly, sequentially, and systematically. The Fast ForWord program seeks to accomplish this task by auditory training that redrives synaptic connections. With the redriving of synaptic connections, children who have had reading difficulties are made phonemically aware, understand the alphabetic principle of English, can apply these phonics skills in a rapid and fluent manner, and possess strengthened syntactical and grammatical skills.

Methods of the Study

The purpose of this study was to observe the literacy development of one child with profound difficulty in oral language, reading, writing, and spelling before, during, and after intervention with the Fast ForWord software (Scientific Learning, 2000). The intent of this study was to extend the understanding of the Fast ForWord intervention in the construction of literacy for a child with severe language delay. This study is a case study which examines one child's experience with the FastForWord software program. The case occurs within a bounded system of a "slice of time" that

observes a single child as a constructor of literacy during the 2000-2001 school year. The methods of this project have attempted to follow the assumptions of the Ericksonian model of qualitative research (Erickson, 1986). Collection of data technically began in February, although familiarity and training with the Fast ForWord software began in September of the preceding year. Given the results Scientific Learning predicted for this pilot project, some pre-existing categories were used in collecting data as a check on specific outcomes.

Formal, semi-structured, and informal interview formats were used to interview Nate's teacher, his mother and sister, and his Special Education teacher and classroom aides. The formal interview was developed directly from the Scientific Learning follow-up questionnaire. The formal protocol was used in interviews with Nate's mother and regular education teacher. These interviews were taped and transcribed. Informal interviews occurred regularly through the study with both of these participants. A semi-structured interview was used with Nate's sister, the Special Education teachers and aides. Many serendipitous, "on the fly" interviews took place as District Office personnel would discuss the program with me as they were passing by for meetings or appointments. One year later, in the spring of 2002, semi-structured interviews with Nate, and with his mother were conducted. Informal interviews were conducted with his new intermediate years teacher and newly assigned Special Education teacher as well. Follow-up observations of Nate in his fully inclusive, regular classroom were conducted in the fall of 2002.

As a staff member on this campus I assumed an intimate participant-observer role, with access to most information about the pilot study and its progress. I often interviewed participants during recesses, sitting in the teacher's lounge, or walking through campus breezeways. A high level of rapport and trust had been established at this site. Nate was observed persistently, at length in his Special Education classroom, in his regular classroom, and at recess. Observations of students using the Fast ForWord program occurred through the duration of the 8 week pilot project. Videotape in Nate's classroom was collected on 6 separate occasions, along with regular field notes and observations. These videotapes were reviewed for emerging themes. A number of categories that emerged in the tapes were confirmed by an independent reviewer.

Triangulation of data occurred through cross-checking data from a variety of sources. A range of documentation for triangulation was collected for this project. All of the Scientific Learning materials including the software documentation were made available. All online data tracking records compiled in San Francisco, pre-test and post-test scores, and IQ testing results were made available. Individual Education Plans along with student classroom portfolios and cumulative records were included in the data corpus. These were also reviewed in a constant comparative method for patterns and themes also.

Fast ForWord Results

Nate enjoys his time on the computer completing the Fast ForWord program. His mother believes that because Nate loves his video games, he is focused on completion of the Fast ForWord exercises . There is no need to cajole or redirect Nate. Nate is easily compliant. He sits down at his computer, adjusts the headphones, loads the program on his computer, and begins where he left off the previous day. At the conclusion of the 12 week Fast ForWord intervention, Nate's progress was remarkable according to Scientific Learning criteria. (Appendix A).

The Circus Sequence exercise is designed to help students differentiate between short nonverbal tones. It builds sound processing ability, sequencing skills, and working memory. In reading tasks, this assists distinguishing among similar sound-parts of words. Nate's performance ended at 94% completion rate for this exercise at 500 hertz of sound frequency and 80 milliseconds sound duration. Nate completed a total of 8006 trials in 12 weeks on this intervention exercise.

The Old MacDonald's Flying Farm exercise helps children develop phoneme discrimination, builds auditory processing, sustains focused attention, and creates understanding of critical word sounds. For reading tasks, accurate associations between letter representations and spoken language are generated. Nate had a 100% completion rate. Nate processed and distinguished 5 phoneme pairs at 100% accuracy rate over 1472 trials.

His Phoneme Identification completion rate was 99% with 5 phoneme pairs over 4585 trials. This exercise encourages students to match the sounds of similar phonemes to build auditory discrimination skills, auditory processing speeds, working memory and phoneme recognition. His Phonic Match was completed at a 92% completion rate. This is an exercise in concentration and requires the child to match sounds. Cross training of memory and reasoning skills occur along with the development of phoneme recognition, as well as development of simple word structures. All are essential reading task skills. 17585 trials, concluding with sounds made at the rate of natural speech. Nate averaged 60% matching rate with these exercises.

Phonic Words trains the child to differentiate between two similar words that differ only by an initial or final sound. The program builds sound processing speed, phoneme and auditory recognition and early understanding of word meaning. The letter-sound representations of spoken English link this exercise to reading. Nate completed this exercise at 99% completion rate. Thirteen thousand and ninety trials concluded with natural speech and at correct response rate of 96%.

Language Comprehension Builder helps students match pictorial representations with sentences they have just heard. This builds language and listening comprehension skills. It improves grammar, syntax and morphology as it cross-trains oral language skills at a simple and more complex level. Nate completed this exercise at the 98% level over 3854 trials. At the natural speech level, where the largest number of trials occurred Nate responded at a 90% rate of accuracy.

The Block Commander helps the listener to follow increasingly complex commands. In this exercise, Nate had a 75% completion rate. His average was 73 % accuracy in following spoken commands and event sequencing over 1449 trials.

These results from the 8 week intervention period with the Scientific Learning Fast ForWord software seem to indicate that Nate was able to complete all 7 exercises at a high rate of completion. Except for Block Commander, Nate's rate was exceptional in the 90% range and indicates little problem in compliance or motivation. His accuracy rate was high in each of the exercises as well. Except for Phonic Match, Nate's rate of accuracy was in the 90th percentile. The trials for each exercise were well over a thousand, with Phonic Match the highest number of trials at 17585. This is the exercise with the lowest rate of accuracy. The question arises as to which component of the game challenged Nate. Other sound differentiation games had far better results. Concentration on the Fast ForWord games is not a difficulty for Nate. He spent much focused, concentrated time on the intervention and scored well in all exercises designed to build his reading skills except for Phonic Match. The cross training of memory and reasoning skills with sound differentiation appears to be the challenge. Even so Nate, performed in the average range with this game.

By all indicators in the Scientific Learning protocol, Nate should show dramatic improvement in all areas of language learning upon completion of the program. Scientific Learning has maintained that some children exhibit greater improvement in language learning than other children. The success of each child's participation is based on many, complex factors. The program demands great commitment from everyone involved. The child must be determined; the parents of the child must be encouraging; the school professionals must be enthusiastic and conscientious in adhering to the program protocol (Turner & Pearson, 1999). It must not be viewed as a cure-all or a substitute for other kinds of therapy.

One Year Later

Nate began the 2001-2002 academic year with a new regular education teacher, a new Special Education teacher, new classmates, and a new classroom after spending three years with his primary multiage teacher. This year marks a transition from the nurturing of early childhood years to the middle years. This transition marks “learning to read and write” to “reading and writing to learn.” Over the summer, Nate has grown taller but still remains a graceful runner. He meets friends from his old class at recess to play wall ball.. His features are maturing and his grin easily compliments his expression now. Much has transpired over the summer for Nate; many things of which Nate is not aware. His parents have requested a change in Nate’s IEP so that all of his services are delivered in a full inclusion model. They do not want Nate pulled away from his classmates for separate instruction. They reason that if the Fast ForWord intervention has indeed worked for Nate, he will benefit most from the richest environment, the richest experiences complemented with direct special needs instruction within his own classroom setting. They fear a cycle of self-fulfilling prophecy and lowered expectations for Nate if he continues in a pullout model of services. Nate’s parents fear, as well, that without the consistent modeling of more competent peers, Nate’s literacy acquisition will be slowed, perhaps even stunted in a special education resource classroom.

Nate has continued his involvement in cartooning and, yes, he still wants to be a cartoonist. He continues to compose science fiction stories with a new writing partner to scribe his elaborate plots. He has consumed the Harry Potter series voraciously (Rowling, 1998), but only with intense support and scaffolding from his parents and the instructional aide in his classroom. His mother reports that the movie version of the story “turned him on to the book”. He says he can imagine the events of the story in his mind because of the movie and that helps him to read the book. Nate participates in literature circles with other students in his class after listening to the books on tape, he responds to the literature dialogue in his own journal, and participates in the weekly spelling tests with his class. All of his work is modified and expectations are aligned with his IEP goals. Nate has made language gains, but the gains hardly measure a year’s growth as assessed by district and by national standardized testing. In leveled, vocabulary controlled, decodable text, Nate is reading at 2.5 grade level. His written work is maturing but, his sentences are choppy, poorly formed with reversals and illogical invented spellings. Nate’s stories are told in his elaborate illustrations.

Nate comes in from the playground on this brisk fall morning and is deep in animated discussion with his writing buddy. They sit together at the same work table, and Nate pulls out his writer’s notebook to begin sketching the topic of his animated discussion with Anton. He becomes oblivious to the activity around him as he furiously draws in his notebook. He misses the directions for the morning’s reading activity so his friend nudges him to pay attention. A youth newspaper is passed out, but Nate stealthily pulls his notebook out from under the newspaper to continue drawing. He is reconstructing the entire sequence of events from his recess story in cartoonlike frames. He

creates bursts of gunfire and attacks by aliens, all accompanied by his whispered sound effects. Nate completely misses the reading ‘opportunity’ required of the rest of the children in class as he focuses on his storyboard. He has no idea when or what to contribute to the classroom discussion about the newspaper articles. And when comprehension questions taken from the newspaper are passed out, Nate has no idea what to write down. There will be a zero in the gradebook again for Nate on this quiz.

After lunch recess, the students in Nate’s class settle in to hear the latest installments from Roald Dahl’s children’s classic *The Witches*. As each character of the story comes to life with animated voices, Nate grins and chortles. He loves the read aloud time in his class and listens to the adventures of the boy turned mouse terrorizing a hotel kitchen. All of the language activities that bind his intermediate multiage class into a community are occasions that he participates in completely and joyfully. Academic, efferent reading escapes him while aesthetic, storytelling ignites his imagination (Rosenblatt, 1995). Nate continues to have difficulties with content reading and writing. He is not very different than other fourth grade boys.

The meanings of language learning understood by Nate’s teacher and his family and the ideas held by the Special Education department of the school district conflict dramatically. Nate’s mother describes the growth that she had seen in her son’s literacy and language development as a flourishing love of oral storytelling. Rehashing the day with the family at dinnertime is a special event. After years of minimal language use and little talk, Nate describes his days at school, his field trips, and his new stories in elaborate detail. His stories are so lengthy that his mom must ask to get a word in herself. She relates his language growth in story writing at home with “great big abstract ideas about...the hero, they always have aliens who come in” too. She tells of his emerging sense of humor and penchant for practical joking. He has begun playing with the nuances of spoken language. Bedtime rituals are extended occasions with Nate’s father reading to him in expressive, animated voices. These “lap reading” experiences often last up to an hour, father and son talking, laughing and settling down for the night together. These are warm, family times and Nate’s language is embedded in the support and care of his parents and sister. His language has real, authentic purposes, an important listening audience, and the beauty that words of connection convey. At home, Nate is an authentic language learner and language user. Important, significant others mediate Nate’s literacy development.

At school, Nate continues to have language deficiencies. The IEP say he can’t read or write yet he can imagine, draw, and compose and elaborate story plot. The Special Education department describes Nate’s growth and the goals for his language and literacy development in this way:

“Nate requires cues to look and listen when directions are given.

Nate has difficulty describing personal events.

Nate will be able to identify in isolation the first 400 basic sight words from the Most Frequently used Words in Literature list.

Nate will be able to use phonetic strategies and be able to identify consonant digraphs when decoding unfamiliar words.

Nate will be able to correctly spell the first 350 words from the Most Frequently Used Words in Literature list.

Nate will be able to write a story, or other format with the following: correct grammar, correct capitalization, correct punctuation.”

The language of Nate’s IEP is the discourse of a positivistic, medical model of human behavior. It is the discourse of deficiency that necessarily categorizes and reduces children. Nate is LD, with SLI. The words draw attention to his problems, shortcomings and incapacities. His Individual Education Plan uses the vocabulary of human deficit (Lubeck, 1996). The language of the IEP gains its authority in Nate’s education because it is difficult to understand, because it is ambiguous, and because it is full of oblique, technical terms (Mehan, 1989). The IEP locates Nate’s language difficulties within him. The research behind the Fast ForWord intervention locates Nate’s language difficulties in a specific region “behind his eyes and between his ears” (Mehan, 1989). His language learning needs, according to the technological intervention which the district Special Education department has provided for him in the Fast ForWord program, includes decoding skills such as matching specific sound sweeps, identifying when a new syllable interrupts a repeated syllable, matching one syllable to the target syllable, matching word or sound to a picture, matching the initial or final consonant sounds in two words, matching a sentence to pictures that depict the meaning, and following instructions for matching shapes. The technology manipulates bits of sound, in a decontextualized, isolated framework so that synaptic responses in the occipito-temporal region of Nate’s brain are prepared for response (Scientific Learning, 2000).

When do bits of sound become meaningful words? Humans possess a remarkable brain mediated capacity to make sounds and to allow those sounds to act as representations of objects, people, places and ideas. Here is a confusing tension. Language, the most amazing human, social construction, starts when words have not even been spoken. Communication starts with gazing, rocking, stroking, kissing, and humming. The touch of love creates a bath of somatosensory physical sensations which neurophysiologically begins communication. (Perry, 2001) For each infant, repetitive spoken language in the bath of sights, sounds, smells and touches that are love provides the stimulus for neural organization that develops into complex language. Language is social-emotional communication. Nonverbal interactions in human contact are the beginnings of language.

Only a fraction of total brain mass is dedicated to verbal languaging. The majority of communication for humans is nonverbal. The higher percentage of the brain perceives the nonverbal signals of communication. Eye movements, facial gestures, tone of voice, intonation, latency to respond to questions, hand movements, and the tip of the head are all automatically processed by the brain as part of understanding language.(Perry, 2001) Children learn language in the fabric woven of human action. Children learn communication in a synchronous verbal and nonverbal combination of words and matching actions. Children do not learn language from flashing sound bits, or from matching pictures on a computer screen with headphones in virtual isolation. It is learned with people. Language is socially constructed. Language is a cultural tool experienced by the child in a specific social setting (Vygotsky, 1962).

Technology use in early childhood education is here to stay. It has propelled Nate's classroom into the computerized information age. In a matter of seconds, data reports and information are available to children, teachers, parents and administrators. Children are highly motivated to read, write, publish and inquire on the computer. Classmates in Nate's room produce a weekly newsletter to go home to parents on a template that is always loaded on the classroom computer. Groups of children contribute articles and highlights to every newsletter. They pull their chairs into the workstation to negotiate, write, and rewrite the flyer. It is an intensely social, sometimes gossipy language occasion. Many of the classbooks in the large open face bookshelves have been produced on the class computer. These computer-generated books are dog-eared and smudged from many fingers. Children in this class are composing, editing, revising and publishing on the computer regularly. The workstation has online capacity and as a group of students write up their research notes on Japan, others can access search engines finding new facts and images of Japan during Writer's Workshop. The Internet is their door to the world. Literacy on the computer is extremely rewarding. Literacy on the computer differs from literacy in printed text. It is circuitous; it is not from left to right and top to bottom. It has many paths. It speaks in text; it speaks in images, and it speaks in sound bits. It speaks in multiple languages. It is multi-modal, combining the elements of written language, images and graphic design to enhance the child's communicative power.

It is the end of the nine week grading period. Nate and his classmates join the teacher at the computer. One by one she calls them back to the workstation. The two, student and teacher, look at a report card screen. Heads together, they conference on the progress of the past nine weeks, and the teacher enters anecdotal notes during their discussion directly into the computer. They read the narrative out loud together when she has finished typing. This is real reflection and genuine self-evaluation. Nate will be able to go home and read his report card entries aloud to his family as he has done with his teacher. Nate fairly glows as he reviews his work in Science with the *Solids and*

Liquids study that they have completed. Nate's teacher has his science journal full of his illustrations and his words about the experiments he has completed. His journal has a 'Contents of Table'.... "No, that should be a Table of Contents" he says as they flip through it. Together, teacher and young scientist fill in his Science grade for this nine weeks. A 3! There is collaborative, meaningful use of the computer workstation in this classroom.

During the first week of March, approximately 12 weeks after the conclusion of the Fast ForWord pilot, sales representatives from Scientific Learning visited the district office Special Education personnel and the school administrator as a follow-up visit. Scientific Learning Corporation offered the school district a package deal on the Fast ForWord Family of Programs. A lifetime purchase plan was proposed to include the full software packages for all levels of Fast ForWord—Fast ForWord, Fast ForWord Language to Reading, Fast ForWord Middle/High School, and Fast ForWord Reading. In addition, for the benefit of the adult language learners in the evening English as a Second Language classes, software for adults was included. The program was marketed as a language and reading *curriculum* for all ages and grades, not an intervention with special needs children. The company further added 100 hours of professional development via online coursework through Chapman College to the school staff. The total cost of the lifetime purchase plan would be \$60,000. A bargain in comparison to the costs of the pilot study.

But, the honeymoon period with the software is over. The district director of Special Education Services reports a regression effect emerging. Some of the large "leaps in development are deteriorating with noticeable skill loss" for some of the 10 children. She compares the program to the "Tomaso method" in Special Education, the Wisconsin Design for Reading, the Sullivan Programmed Readers, the Miami and Palo Alto linguistic readers, the International Teaching Alphabet, Words in Color, DISTAR, and multisensory phonics. She believes that the methods are very similar and are proving to have the same kinds of disappointing results. Special needs students show a spurt of growth immediately after the intervention. Then, they lose skills and regress. She is uncertain what causes the initial growth spurt. The new intervention or the novelty and focused attention that the child receives may explain it. She has seen many programs come and go in her 20 year career as a Special Education teacher. Many just plain don't work. Try everything she says, but don't believe in a cure-all magical, miracle pill.

Technology use in early childhood education is here to stay. While technology has become increasingly more complex, so has its capability for enriching classroom life. The tension of the increasing push to make technology better drives costly improvements in school hardware and software. Literacy will always have communication and information handling as its core, but the commonly identified processes of talking, listening, reading and writing will be extended to include making, viewing, and using. (Downes & Fatouros, 1995) Reflection and knowledge about the impact

of technology on learning and instruction is often missing in adopting programs. The evaluation of software programs must consider the generation of high quality oral language, the establishment of friendship pairs, and open-ended programs that allow children self-determination of goals and pacing.

The computer has benefited many students in recent years and particularly the child with special needs. Children with poor motor control, illegible handwriting and language impairments have been shown to benefit most. (Downes & Fatouros, 1995) These benefits accrue in using programs that allow a variety of possible responses or pathways. The clever colorful screens and clever animation of Fast ForWord are not accurate indicators of the learning potential inherent in most software programs. Those who buy expensive software packages for schools are often removed from real classroom practice and purchase software that is not consistent with the teacher's philosophy of children's learning. Tensions intensify as administrators are then directed to turn in printouts of implementation results.

Discussion and Implications

Language is a social construction, and as such, is determined by historical, economic, and political conditions. Language exists so that humans can communicate. It finds its beginnings in the rich matrix of bonding and attachment that happens in the first days of life. All children are language users from their first moments as they communicate distress, hunger, cold or fear by crying. Their first language is wordless, nonverbal. The words that become spoken language have no meaning in themselves to children. They must be spoken with intent to communicate something; they must be spoken in association with someone. Language is born in human relationship. Language is born in material conditions.

Literacy has at its heart communication. It is dance, film, pictures, video, music, physical movement, talk, art, print, *and* computer imagery. All children are literate. Literacy is more than decoding and encoding sound bits. Reading begins as the infant is rocked and sung to sleep with words of poetry. Writing begins with the first smudges in a steamy window. Reading and writing are complex relational processes. These communication processes express a model of the universe of economic, political, and social conditions and the universe of life conditions. Children do not first listen, then speak, then read and then write in a simplistic linear relationship. Children do not become literate according to a universal, inviolate timetable of acquisition. The Fast ForWord program has replaced spoken and written communication forms with visual communication forms. Visual imagery, the intelligence of sight, is designed to electronically capture the meaning of the alphabetic principle and the meaning in words. Visual perception, thought, then language are linked. The virtual reality presented to young children in this software subordinates written text to visual text. Much of what young children experience today is the entirely virtual reality of television, photographs, video, and

telephone. Electronic extension of self has become resonant in postmodern culture. The interactivity of the program reduces the space between the symbol and object in language use. It suggests that an electronic curriculum provides a kind of representation without real language in which the child inhabits and experiences the world through immediate, virtual perception.

What has emerged in this study is the confusing, dissonant tension between the meanings of language and literacy of opposing education ideologies currently put forward in binary opposites of 'modern textualists'. On the one hand, meaning-centered, reflective, critical classroom practice failed to induct Nate into the natural process of emergent literacy. Embedded, contextualized instruction did not help Nate to 'construct' the alphabetic code for himself. Direct, systematized training in sound sweeps and code emphasis phonics instruction did not create the neural connections for Nate to rapidly progress to the next level of language development. The magical, miracle pill does not appear to have worked either.

If language, as it is expressed visually, electronically in the Fast ForWord program is taken as a model of the relationships between the economic, political and social conditions and schooling, what life conditions are expressed? Electronic instruction with technology in early childhood education will not be short lived. It is clear that technology in communication has empowering potential. It is equally evident that technology has powerful stratifying potential. A child that spends nearly one quarter of the school day in non-human interaction, in a virtual reality, is foregoing critical social-emotional development opportunities in real human interactions. The cost for this capacity for a certain kind of abstraction associated with electronic communication is unknown. Drawing on Althusser's explication of ideological state apparatus (1971) and Pierre Bourdieu's analysis of cultural capital (1984) as frames of analyses, the implications from this case study are far reaching. Louis Althusser, expands Marxist theory of ideology as a practice with lived social and material dimensions. Ideology has costumes, rituals, behavior patterns, and ways of thinking. The State (read *policymakers*) employs Ideological Apparatuses to reproduce ideology through practices and production in organized religion, the education system, the family, politics, the media, and the industries of culture. Decades ago Althusser wrote, "...I believe I have good reasons for thinking that behind the scenes of its political Ideological State Apparatus, which occupies the front of the stage, what the bourgeoisie has installed as its number one. i.e. As its dominant Ideological State Apparatus, is the educational apparatus, which has in fact replaced in its functions the previously dominant Ideological State Apparatus, the Church. One might even add: the School-Family couple has replaced the Church -Family couple" (p.117). The ideology of the age of consumption in which we now live uses media, advertising, and popular culture to transform individuals into consumers. Our attention is attracted and we are interpellated, says Althusser. We become transformed into the subject of the material practice of consumption ideology.

Richard Allington in *Big Brother and the National Reading Curriculum, How Ideology Trumped Evidence* (2002) alludes to a new coupling of ideologies to replace the School-Family couple which Althusser named. Current educational policy (read *state ideology*) has eroded the autonomy and the level of professional responsibility which teachers can exercise in order to teach reflectively and to respond appropriately to unique, individual needs. Through the ‘accountability’ discourse, policy makers have framed teachers as inept, mediocre adults who teach what and when they want, who prefer fads and frills to the hard work of basic skills instruction, who have low level expectations, and misteach vast numbers of children. Philosophical views of language and learning that believe meaning-making is the central purpose of education result in educational malpractice, the accountability discourse maintains. What has occurred in the past several years has been the federalization of American instruction and the “stupidification” of teachers (p.33). Teachers have been traditionally lauded for their value-inculcating and value-forming role in the schools. The popular media and federal agenda in public education blames teachers for school failures. Scripted, electronic instruction delivered via technology, instruction with non-teacher monitoring, as in the Fast ForWord training, works to convince the public that educated, degreed teachers are unnecessary. Public opinion is shaped to convince the public that teachers and teacher preparation do not matter when learning on the computer with digital technology or in adhering to ideologically mandated, prescriptive curriculum. The new coupling of ideologies is the marriage of the means of production dominated by the worldwide web and information technology with the popular consumption of electronic techno culture that transmits ethics, values, and mores of consumption. Education ideology is deeply rooted in consumption capitalism. A **McSchool** mentality objectifies teacher and students, with schools as the product outlet for the commodities of learning (i.e.. Test scores, diplomas, standards) dictating policy agendas across the country.

The costs of technology to schools and the acquisition of computer literacy for children today raise real questions of cultural capital (Bourdieu, 1984). Nate along with nine other students have been diagnosed with an acoustic reception abnormality. They have also been judged to have acoustic masking difficulties. They have difficulty sequencing rapidly successive sound inputs because the sounds interfere with one another. Discriminating among frequencies is problematic for them. Scientific Learning corporation has designed and developed the computer software that combines neuroscience, psychophysics, linguistics with findings in educational remediation to cure them for just \$950 per child. The school site could have a one-year site license for one program with the price tag of \$20,000. But the license must be renewed each year, at a renegotiated cost.

Ten children receive eight weeks of training at a cost of nearly \$10,000. The regular classroom teacher on the same elementary campus receives a yearly warehouse budget for paper, pencils, pens, markers, glue and crayons, the materials Nate uses to create his books with Stetson, of

\$215. The cost of piloting this language program with these 10 children is approximately one quarter of her yearly salary after 17 years of teaching in the district. Nate and the nine other children in the pilot study spend 100 minutes every day on the newest machines on the school campus; these are state-of-the-art iMac computers in a bright cobalt blue. For two long blocks of time in the morning and the afternoon, the computer lab that houses these computers is unavailable to the other 982 children on the campus. The ongoing projects in creating slide shows for research findings, composing and publishing stories, researching on the web and creating graphics are postponed. The reading and writing and desktop publishing that is authentic literacy pauses for computer generated sound bits in isolation. These are the computers that must be used because of the level of memory and the Internet access that is mandatory for uploading data each day. These are the computers that must be used so that the sophisticated CD's in the program are properly configured to hardware. And so, 15 other machines stand idle while 10 children listen for asynchronous syllables.

The director of technology services in the district of this study has recently taken over the department. She is a middle aged teacher who began her career in education at a Junior High in this district. She detoured into technology 12 years ago with a multidisciplinary Masters Degree. She says she saw the 'writing on the wall' and went into computer education in her graduate coursework. Technology will revolutionize education. She indicates that the bellwether state of Texas is opting to spend curriculum budgets on laptop computers and software rather than textbooks. Her office has few print books. The shelves have lots of software documentation and binders with department records. But there is not library of professional books. She does have several laptop computers on her large polished desk. One is a Macintosh; one is a PC. Both interface with laser printers. A palm pilot rests in a charger on her desk and at regular intervals her administrative assistant steps into the office with a small wand and makes entries into the device. A cell phone also rests in a charger. A district pager is next to it. Outside of her office door is a massive office machine that is copier, fax machine, and laser printer. The digital age makes this office hum. When interviewed, she reported that the technology services department has the largest budget of the entire district. The explanation for the disproportionate size of the budget she defends is not only in the pricing of the machines themselves, but in support of massive administrative systems and the software costs for them. Indeed, technology has ushered in a new digital information age. The funds allocated for technology are funds that are not invested in books, reducing class size, and libraries.

The school districts that will benefit most from technology in education will be those that have invested in the most current hardware and software components. These are the districts with ample budget to meet technology requirements. These will be the districts building new schools (read suburban school districts) designed for technological capacity. These will be the districts that find partnership resources with the business community. In a recessionary economy, with state budget

crises pressuring school districts, older urban districts must have savvy grant writers to secure outside funds/grants for technology resources. The children who arrive at the classroom door with computer literacy skills in place are those with the cultural capital which provides a personal computer and early learning software in their home/care setting. Children in the urban core, where schools are older and not retrofitted for technology, are also those without the cultural capital of computer literacy or conventional English literacy skills, in the first place. *A double whammy*. Bourdieu defines academic capital as the product of the combined effects of cultural transmission by the family and cultural transmission by the school (p. 23). These are all too frequently the children from differing cultural contexts, learning English as a second or third language, and without the language and literacy of American schools.

Schools are in a rapid transitional flux during the repositioning of the Ideological State Apparatus. In an education system of equal access, challenging the widening chasm between the social strata with and without cultural and educational capital must continue. Ungrounded faith in technology as a quick fix to the language learning and literacy needs of children is dangerous at best. Naïve belief that all children can and will naturally, joyfully enter into literacy is equally dangerous. Technology cannot replace the human relationship that encourages language and literacy. Informed, knowledgeable implementation of technology is absolutely necessary in the postmodern world. Teachers must be technologically literate so that technology can augment the way children develop text. Teachers must be vocal about making decisions as to how technology is implemented in the classroom. Teachers must be vocal in communicating their understandings to parents. Teachers must find Voice while the federalization of schools and the national education agenda is systematically silencing their voice.

The child in the postmodern world will be most engaged in learning that is electronic. Visual text will speak more than written text in his schooling career. Becoming literate in the postmodern world will include reading images, rapid fire information processing, short spans of focused attention, and text in a dizzying array of presentations. And Nate? He is Every Child in the postmodern world. The language disability with which he has been categorized and labeled proceeds from the discourses of print literate, modern culture that is bound by written text. He will make slow, continued progress in reading and writing. It is critical that he does.

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