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THE EFFECTS OF WEB-BASED READING CURRICULUM ON CHILDREN'S READING PERFORMANCE AND MOTIVATION*

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ABSTRACT

This study investigated the benefits of using a Web-based reading curriculum program featuring music and video, on struggling readers' performance and motivation. A sample of 36 third grade students from low socioeconomic backgrounds was randomly assigned to receive Web-based or traditional reading instruction. Analyses of performance indicated basic reading skills improved significantly higher for students who received Web-based rather than traditional instruction. Results also showed a significant correlation between reading performance and motivation among struggling readers. Qualitative differences in motivation and engagement were observed across ethnicity among students who received Web-based instruction. The results and educational implications are discussed in relation to the cultural relevance of computer and non-computer-based learning environments.

Learning to read is an important milestone in children's development and proves to be the critical foundation for children's academic success. In fact, research continues to show that without a strong foundation in reading, the chances for occupational success in today's demanding technological society are limited (McCardle, Scarborough, & Catts, 2001; National Center for Education Statistics, 2000; NICHD (National Institute of Child Health and Human Development, 2000). A large number of school-age children, including children from all social

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classes, have significant difficulties in learning to read, although some children with certain demographic characteristics are at greater risk for reading difficulties than others (Campbell, 1996; Lonigan & Whitehurst, 1998; Snow, Burns, & Griffin, 1998). Children from poor families, children of African American and Hispanic descent, and children attending urban schools are at much greater risk of poor reading outcomes than are middle-class, European-American, and suburban children (Denton & Mathes, 2003; Gutierrez et al., 2002; Labov, 2003; Lyon & Fletcher, 2001). Understanding how and why these demographic disparities exist are important as researchers and educators begin to develop effective interventions for these targeted groups (Hakuta, 1999; Jimenez, 2003; Labov, 2003; Snow et al., 1998).

One factor that must be considered in the design of effective reading interventions is culture. Several researchers have argued that a cultural mismatch exists between the schools and the families of ethnic and language minority children with regards to literacy and the teaching practices, which create barriers to children's learning to read in school (Boykin, Tyler, & Miller, 2005; Gallego & Cole, 2000; Gregory, Long, & Volk, 2004; Heath, 1983; Labov, 1995; Slavin & Cheung, 2004; Tharp, 1989). According to the sociocultural perspective in cognitive development, the manner in which an individual makes meaning of the world is mediated through society and culture (Bruner, 1996; Cole, 1996; Kozulin, 2002; Rogoff, 2003; Shweder, 1999). Furthermore, the extent to which a learner engages in a task depends largely on the cultural content of the task and the familiarity of the context in which the information is presented (Serpell & Boykin, 1994; Shueder, 1999; Valsiner & van der Veer, 2000; Wertsch, 1998). In a practical realization of this perspective, focusing on culture in the development of effective reading interventions creates possibilities to organize effective contexts for reading instruction by taking into account local variations in ethnicity and social class (Tharp, Estrada, Dalton, & Yamauchi, 2000).

Contextualized learning occurs when reading instruction is situated in meaningful real-world tasks. An authentic task, activity, or goal makes learning more profound by placing the student in the center of the domain context. Contextualized learning gives the student an opportunity to acquire, develop, and use the cognitive tools needed to learn and master the task. Furthermore, a contextualized learning environment puts students in contact with "communities of practice" that allow students to obtain knowledge and skills from the experts and embrace the beliefs and behaviors of the community (Lave & Wenger, 1991; Rogoff, Turkanis, & Bartlett, 2001).

Review of existing reading instructional methods reveal that many do not extend students' out-of-school literacies and identity quests into classroom instruction (Alverman, 2000; Bean & Readence, 2002; Guthrie & Davis, 2003; Hart & Risley, 1995; Moje, 2002), and even fewer take into consideration the importance of building on students' home language and culture although the positive effect of using this strategy is documented repeatedly in the literature (Gallego & Cole,

2000; Labov, 2003; Lee, 2000; Moll, 2000; Rueda et al., 2003). For example, a growing body of literature examining the learning environment of African American children indicates that music-linked expressive movement is one salient characteristic of African American culture (Boykin et al., 2005; Hilliard, 1995; Lee, 1995). Experimental studies originating from this literature clearly demonstrate increased story recall, story inference, and other reading-related cognitive skills among African American children when the instructional context is infused with rhythmic music and movement (Allen & Boykin, 1992; Allen & Butler, 1996; Boykin & Allen, 1988; Boykin & Cunningham, 2001; Cole, 2000).

The recent flood of computer-based educational tools, the Internet, and computer networking within schools offer hope for renewed efforts to deliver effective and culturally responsive instructional contexts (Kamil & Intrador, 1997; National Reading Panel, 2000; Pinkard, 2001). Digitalized and high quality synthetic speech has been incorporated into programs focusing on phonological awareness and issues related to emergent literacy, decoding, and comprehension. Computer speech along with animation, music, and games that are entertaining and motivational has supported the development of effective reading interventions.

Reviews of existing traditional reading interventions reveal many are aimed at one-one tutoring or small group instruction and provide direct training in phonological skills (Farkas & Vicknair, 1996; Fisher, 2001; Invernizzi, Juel, & Rosemary, 1997; Torgesen, Morgan, & Davis, 1992). Examples of well-known tutorial programs include *Reading Recovery* (Clay, 1985; Pinnell, Degord, & Lyons, 1988). *Open Court* (Adams, 1990) and *Book Buddies* (Invernizzi et al., 1997). While these programs are reviewed extensively in the literature demonstrating reasonable success, questions are raised about the efficacy, sustainability, and cost efficiency of these programs (Foorman, Francis, Fletcher, Winikates, & Mehta, 1997; Snow et al., 1998). It's been argued that the variability in reading skill as well as the increasing cultural and linguistic diversity of classrooms often make whole class reading curriculums ineffective (Au, 2000; Garcia, 2000; Lee, 2000). More advanced students may progress in such settings, but a large number of average and struggling students remain stagnant or regress. Also due to the massive number of students in classrooms, traditional one-on-one tutoring is not a realistic curriculum approach in a classroom context because of the difficulty in locating high-quality tutoring volunteers (Vadasy, Jenkins, Antil, Wayne, & O'Connor, 1997).

The promise of Web-based learning environments may prove to be effective in addressing the issues of cost effectiveness, sustainable, culturally and linguistically responsive, and pedagogically sound curriculum for struggling readings. One such environment we have chosen to investigate is called, *Reading Upgrade. Reading Upgrade* is a Web-based reading tool designed to improve phonemic awareness, word decoding, reading fluency, and comprehension in an engaging manner (Learning Upgrade, 2000). This Web-based curriculum is based on

reading strategies and theories that explicitly considers the readers' sociocultural experiences (Baker, 2000; Gee, 1999; Meacham, 2001). Moreover, the instructional design of *Reading Upgrade is* supported by theoretical approaches that recognize the centrality of developing highly automated decoding skills, while at the same time, doing it in a way that does not de-couple decoding and comprehension. That is, it avoids the long-standing "reading wars" divide between those who favor decoding first versus those who insist that comprehension lead decoding (Chall, 1989; Foorman, 1995; Goodman & Goodman, 1990). It is the authors' position, based on both the research summarized in the report on reading by the National Research Council (Snow et al., 1998) and the Report of the National Reading Panel (NPR, 2000), that an artful mixing of decoding and comprehension provides the optimal conditions for reading acquisition (Cole & Cole, in press; Griffin & Cole, 1987). This mixture is often very difficult to achieve with young readers, who come to the process of instruction with limited knowledge base and often limited oral language skills. *Reading Upgrade* uses familiar text, popular/hip-hop music, language (e.g., verbal praise in English and Spanish) and the everyday cultural experiences of many ethnic minority populations as scaffolds to teach reading skills. Although this Web-based curriculum effectively addresses cultural and instructional aspects of learning to read, the efficacy of this curriculum has yet to be empirically tested with appropriate controls.

The current study investigates the effectiveness of *Reading Upgrade,* in comparison to a traditional non-computerized reading curriculum. Specifically, this study examines whether the *Reading Upgrade* curriculum would improve struggling readers' performance in literacy skills such as decoding, fluency, phonics, and phonemic awareness. Also, this study examined motivational benefits of participation in a culturally responsive computer-based learning environment.

METHOD

Setting

The public elementary school in this study is located in a large, inner-city school district in southern California. According to the school district demographic report, the school enrollment consisted of 656 students, who were 47% African American, 32% Latino, 14% Asian, and 7% European American. The population was evenly distributed by gender and 9% of the students were identified with disabilities. Ninety-seven percent of the students received free or reduced-price lunch. Interest and support from both schoolteachers and administrators made the implementation of the study uncomplicated and well organized. The study took place before regular school hours in a computer lab and small classroom adjacent to the school library.

Participants

Third grade students performing two or more grade levels behind in reading were the target population for this study. Of the 62 students performing, two or more grade levels behind in reading and who received permission forms, 44 students returned the forms and participated in the pre-testing. Due to attrition, 36 students were included in the final sample. The sample consisted of both girls (n= 17) and boys (n = 19). Their ages ranged from 8 years 6 months to 10 years 4 months. The sample included African American (n = 2l), Latino (n = 10), European American (n = 2), and Asian (n = 1) students.

Research Design

The study was designed as a pre-posttest randomized control experiment in combination with ethnographic observations. Experimental and control groups were selected from a pool of struggling readers participating in the schools reading enrichment program. The study was divided into three phases: pretest, treatment, and post-testing. The treatments used in this study included traditional reading instruction and a Web-based reading instruction curriculum called, *Reading Upgrade.* Both are designed for students who have difficulty in basic reading skills, including decoding, fluency, and comprehension.

EXPERIMENTAL CURRICULUM: WEB-BASED INSTRUCTION (*READING UPGRADE*)

The Web-based reading instruction, *Reading Upgrade* (www.readingupgrade.com) is an on-line program that plays on any standard Web browser. The program requires Flash Player 4.0+ Plug-In for the Web browser. The lessons in *Reading Upgrade* are authored using Macromedia Flash MX using Actionscript language scripting. The Web pages and server side scripts are authored using Macromedia Dreamweaver MX (Learning Upgrade, 2000).

Reading Upgrade utilizes several sociocognitive mechanisms identified as necessary for successful learning with technology (Jonassen, 1995). It provides an active learning environment that epitomizes learning that is student-centered, interactive, exploratory, contextualized, intentional, reflective, and collaborative (Savery & Duffy, 1995). With this instructional approach, the student has the benefit of integrating previous experiences, perceptions, and internal representations of knowledge with every new learning opportunity. The design is such that the student uses existing cognitive structures or schemas to select and modify information, build hypotheses, and make sound decisions (Kearsley, 1998). These learning experiences modify existing cognitive structures or facilitate the construction of new cognitive structures. These cogmtive structures provide comnectivity, organization, relevance, and meaning to new experiences allowing for profound understanding and learning. The curriculum presents a new

and meaningful approach to teaching basic literacy skills that draws upon the widely valued medium of popular music and multi-ethnic graphic representations of characters (Boykin & Cunningham, 2001; Lee, 2001; Cole, 2001; Pinkard, 2001). The design of the animated characters (e.g., skin, hair, and facial features), music, text, and encouraging comments (English and Spanish) incorporated throughout the program reflect the everyday experiences of many ethnic-minority children whom are over represented in the population of struggling readers (National Center of Educational Statistics, 2000). Table 1 displays the lesson content of each of the 50 lessons in *Reading Upgrade.*

The intention is for students to spend from 30 to 60 minutes (or one school class period) each day with an Internet-connected computer working on the lessons. Students typically complete from two to five lessons each day depending on their existing skills and the current level they are playing. Each lesson consists of a teaching portion with instructional songs and digitalized videos, followed by a practice activity consisting of an interactive game. When students complete the program they receive a certificate (see Figure 1).

Figure 2 provides an example of a lesson, Level 36 of *Reading Upgrade,* that teaches the decoding of multi-syllable words. The lesson begins with a short introduction showing the word "hippopotamus" breaking it up into syllables and

Table 1. 50 Lessons in *Reading Upgrade*

Letter sounds	Word decoding	Comprehension
Single letters	C-V-C words	Details: 5 Ws
Short vowels	Sight words	Main idea
Long vowels	Silent-E	Order/sequence
Consonant blends	Word families	Compare/contrast
Vowel digraphs	Numbers/days	Sentences
R-controlled vowels	Prefix & suffix	Riddles
Variant vowels	Compound words	Rhyming
Silent sounds	Contractions	True/false
	Syllabication	Follow directions
		Follow instructions

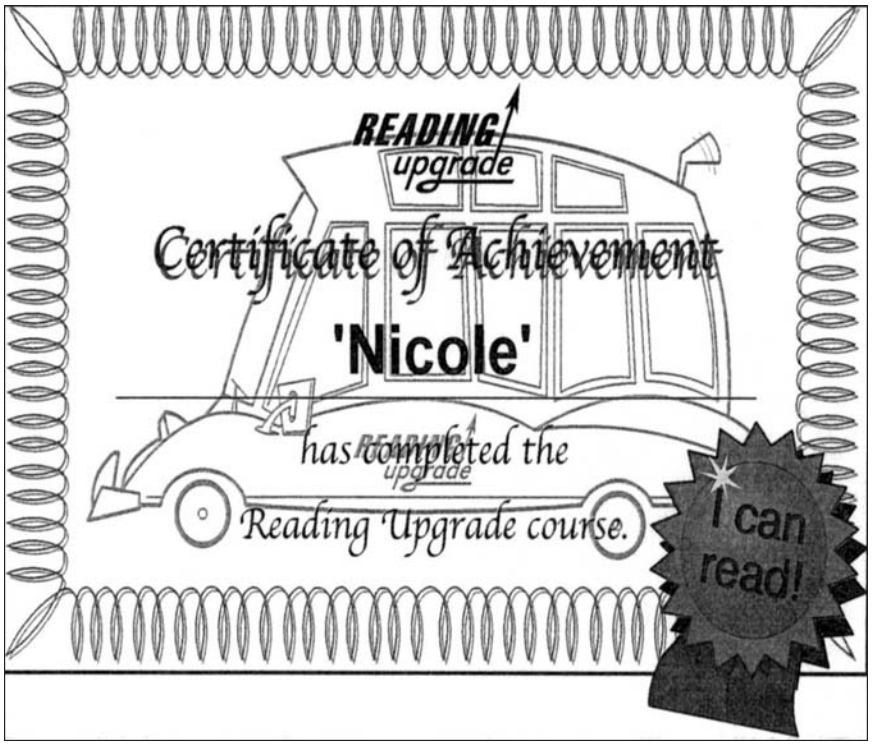

Figure 1. *Reading Upgrade* completion certificate.

connecting them again, with spoken dialog explaining how to read a long word. Then, a 90-second long R&B style song, sung enthusiastically with encouraging comments, breaks up a series of long words and sounds them out: "bas-ket-ball, bas-ket-ball, basketball!" Throughout, large animated text of the word is broken up and syllables swell as they are read. Following the song, the student must listen to a long word read out loud, and then select the word from a list that also contains similar sounding words. The student must read 20 to 50 words to reach 100 points and complete the lesson and move on to Level 37. Figure 3 illustrates lessons on prefixes and comprehension.

All students enter a level 1 and continue until they reach level 50. The *Reading Upgrade* map in Figure 4 shows the 50 lessons students must complete in order to finish the program. The lessons begin with phonics and phonemic awareness and rapidly introduce common sight words, word decoding, and multi-syllable words. The final 10 lessons cover passage comprehension concepts, with extensive practice reading a variety of text.

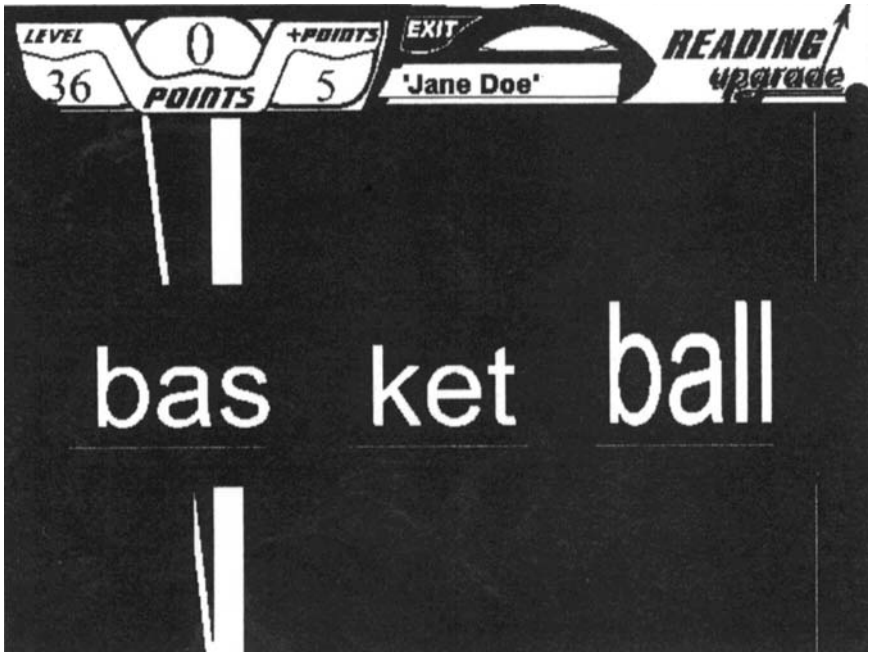

Figure 2. Level 36—How to read multi-syllable words.

CONTROL CURRICULUM: TRADITIONAL SCHOOL PRACTICE (DIRECT READING INSTRUCTION)

The participating school adopted the *Direct Reading Instruction* model for their extended-day reading enrichment program. It involves an emphasis on fast-paced, scripted, well-sequenced, rule-based, and highly focused lessons (Swanson, Hoskyn, & Lee, 1999). Students are instructed in small groups with a reading resource teacher, and given opportunities to respond in unison and individually with immediate feedback using a specific correction procedure. Teachers provide students with the correct response, have the student say the correct answer with them, and then give immediate feedback and a delayed probe on the task initially attempted. The *Direct Reading Instruction model* was implemented daily in the school's extended-day reading enrichment program for approximately 75 mmutes. Students qualified for reading enrichment scored below grade level on standardized achievement/reading tests or were referred by classroom teacher based on observations (see Figure 5).

Figure 3. Screen shots of prefixes and comprehension lessons.

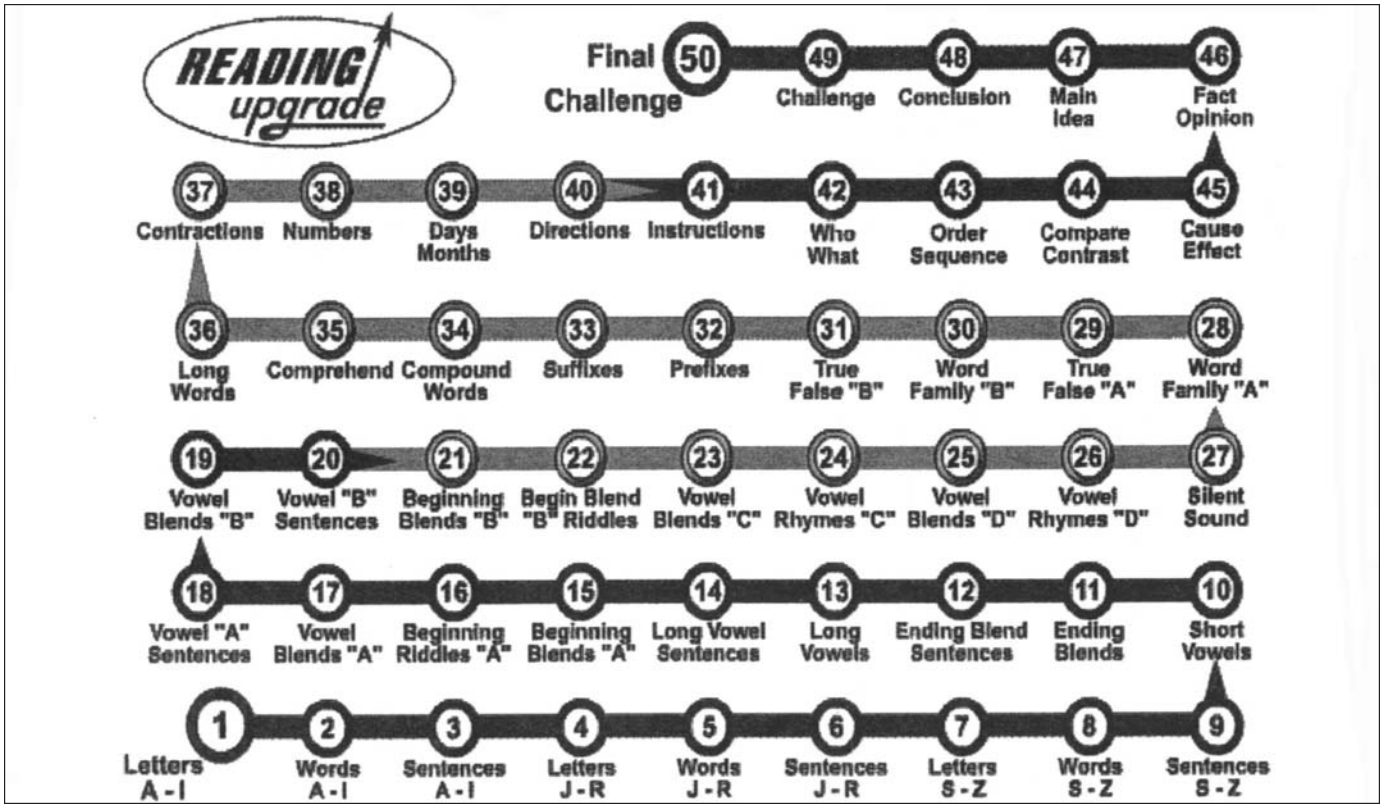

Figure 4. *Reading Upgrade* level map.

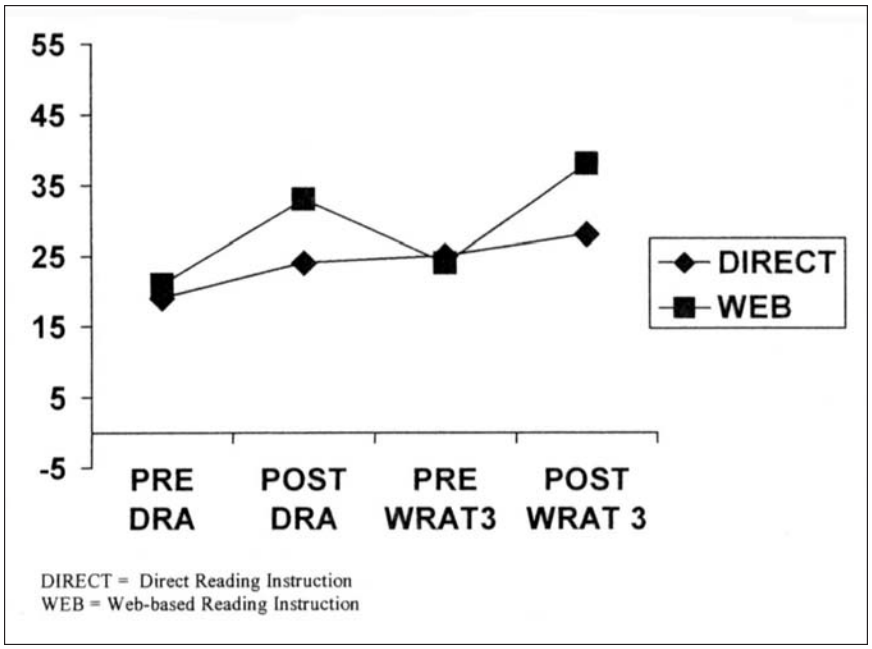

Figure 5. Main effect for type of instruction.

Pre-Post Measures

Reading Measures

Two reading pre-and posttest measures were administered. The frst measure administered was the *Developmental Reading Assessment* (DRA; Beaver, 1998), which requires children to read specially selected assessment texts (20 texts from Level A through 44) that measure reading accuracy, fluency, and comprehension. There are four stages of literacy identified by the DRA—emergent (levels A-2), early (levels 3-10), transitional (levels 12-24), and extending (levels 28-44).

The second assessment was the *Wide Range Achievement Test, 3rd Edition* (WRAT-3) (Wilkinson, 1993). The reading recognition subtest from the WRAT-3 was administered to obtain a measure of students' reading level and gains achieved after the curriculum. Students were asked to name letters and pronounce words out of context. The words were listed in order of decreasing familiarity and increasing phonological complexity. There are a total of 15 1etters to name and 42 words to pronounce. One point is given for each letter and word correctly pronounced. A maximum of 57 points can be earned.

Motivation Measures

Quantitative and qualitative measures were administered to assess students reading motivation and engagement during the instruction. The quantitative measure was a 12-item reading motivation questionnaire, adapted from Wigfield, Guthrie, & McGough's (1996) reading motivation scale, assessed three different aspects of reading motivation: *Avoidance, Recognition,* and *Satisfaction.* Reading Avoidance is defined as what students dislike about reading or view reading as work. Recognition for Reading describes the gratification in receiving a tangible form of recognition for success in reading. Reading for Satisfaction refers to enjoyment of experiencing different literary text or information. Students answered each item on a 1 to 4 scale, with 1 = very different from me, 2 = a little different from me, 3 = a little like me, and 4 = a lot like me.

The qualitative measure in the study used observation field notes. The authors and two trained research assistants observed students for aspects of motivation and engagement (e.g., time on task, initiative, spontaneous collaboration, and enthusiasm or frustration) for approximately 20 minutes across 40% of the Web-based reading instruction sessions. Student behaviors were recorded in narrative style and indexed based on general themes. The development of content categories was an iterative process and followed the principles of "grounded theory" (Glaser & Strauss, 1967), "progressive focusing" (Hamilton, MacDonald, King, Jenkins, & Parlett, 1977), and "collapsing outlines" (Smith, 1978). Inter-observer reliability of motivation and engagement was calculated for 40% of the sessions by using a formula suggested by Miles & Huberman (1984, p. 63): number of agreements/number of agreements + number of disagreements.

Procedure

In three 4-hour sessions, the authors trained two research assistants to serve as observers during the Web-based instruction. The observers were senior undergraduate students with backgrounds in education and psychology. The authors familiarized the observers to all 50 levels of the *Reading Upgrade* curriculum. Training was provided for three types of exercises within the curriculum (i.e., letter sounds, word decoding, and comprehension) and the behaviors that may emerge while students receive instruction. Six critical motivational behaviors were emphasized throughout the training. These behaviors included (a) frustration, (b) competition, (c) enjoyment, (d) collaboration, (e) cultural responsiveness, and (f) acknowledgment. During the training sessions, the authors acted as students and modeled each behavior while completing one of the exercises in *Reading Upgrade.* After each model, the research assistants were asked to describe the behavior observed. If the research assistants described the behavior incorrectly, the authors immediately corrected the error and modeled the behavior again. Training was completed when the observers correctly described all six motivational behaviors modeled.

After meeting with the school principal, the researchers agreed to target the third-grade population, as this group had the largest number of students in the school's reading enrichment program. Next, the researchers obtained participant permission slips from the third graders and their parents. Once the deadline for permission slips was met, the authors and research assistants randomly assigned 36 students to Web-based (n = 18) or control (traditional reading instruction) (n = 18) groups. After random assignment, both groups were administered the DRA and WRAT-3 pretests. Both groups received a total of 180 minutes of instruction before school hours over an 8-week period.

The Web-based instruction occurred in a medium-sized computer lab where participants selected their own seats. The computer lab consisted of several desktop Apple Computers and a cart of 20 wireless Apple Notebook computers. Research assistants dispersed the notebook computers and a set of headphones to each student. Participants logged into computers, placed headphones on their ears, and played the *Reading Upgrade* program. The program tracks the level on which students last worked and continues from previous logged in session. Participants worked twice a week for approximately 90-minutes with 10-mmute breaks offered each session. Once participants reach level 50, they receive a certificate of completion. Research assistants allowed participants to review previous levels at their own pace if they completed the 50 levels of the *Reading Upgrade* course before the end of the 8-week period.

Participants in the control group, the school's conventional reading enrichment program, met with a reading specialist teacher for one hour three times a week. Using the *Direct Reading Instruction* model, teacher and participants sat around a circle table and read selected texts based on participants reading level. Teacher instructed participants to line up and return to their regular classrooms at the end of each session. At the close of the 8-week period, all participants were post-tested on the DRA, WRAT-3 and administered the reading motivation questionnaire.

Teachers and school principal visited 50% of the sessions for approximately 15 minutes for the entire 8-week period.

RESULTS

Our overall hypothesis was that the Web-based curriculum, *Reading Upgrade,* would promote reading skills and motivation of the children in the experimental group. To test our hypothesis, we examined pre- and post-test measures of reading (word decoding, fluency, and comprehension) and motivation in the experimental and control groups.

Reading Performance

Preliminary analysis revealed no significant effects for gender, age, and ethnicity on reading performance. Further, these variables did not significantly

interact with the central variable of interest (type of instruction). Thus, these variables were not included in subsequent analyses. The overall scores on the pre- and post-test provide an assessment of participants reading performance. Descriptive statistics of the pre-and post-tests scores for the two groups are shown in Table 2.

The two groups were compared using a one-way analysis of variance (ANOVA) with type of instruction as the independent factor and the mean pre-post tests scores on the DRA and WRAT-3 as the dependent factors. Analysis of the pre-test mean scores on the DRA ($F(1, 35) = .391$, $p > .05$) and the WRAT-3 ($F(1, 35) = 3.37$, $p > .05$) showed no significant difference between the Web-based and traditional reading groups prior to instruction. Analysis of post-test scores reveal a significant main effect for type of instruction on both the DRA ($F(1, 35) = 41.68$, $p < .001$) and WRAT-3 ($F(1, 35) = 63.97$, $p < .001$), such that the Web-based group of students performed higher than did the traditional group of students on reading measures. Figure 3 depicts this effect. The pre-post test gain in the *Reading Upgrade* group is equivalent to one grade-level improvement according to the DRA and WRAT-3 conversion scale.

Motivation

Table 3 illustrates the correlation matrix. The Pearson Product Moment correlation coefficient was used to assess the relationship between the reading motivation subscales (Avoidance, Recognition, and Satisfaction) and the overall mean scores (combmed DRA and WRAT-3) on reading performance. These analyses produced a high negative correlation between reading performance and Reading Avoidance ($r = –.72$; $p < .01$) and Reading Recognition ($r = –.76$; $p < .001$) suggesting low reading performance is associated with higher book

Table 2. Descriptive Data for Reading Performance Measures

	Measures											
	DRA						WRAT-3					
	Pre		Post			Grade level	Pre		Post			Grade level
	M	*SD*	*M*	*SD*	Gain		*M*	*SD*	*M*	*SD*	Gain	
Reading Upgrade (*n* = 18)	21.83	4.27	33.16	5.20	11.3	3	24.94	3.21	38.22	3.01	13.3	3
Direct instruction (*n* = 18)	19.77	3.07	24.05	3.69	4.28	2	25.50	2.38	28.16	4.41	2.66	2

Table 3. Correlations of Reading Motivation Dimensions and Performance

	Satisfaction	Recognition	Avoidance
Reading Performance			
Reading Upgrade	.656	–.760**	–.725**
Traditional	.150	–.458	–.522

**$p < .001$

avoidance and greater motivation to read for acknowledgment or extrinsic factors. No statistically significant relationship emerged between reading performance and the Reading Satisfaction dimension on the motivation measure.

Observations

Interobserver reliability of motivational behaviors was calculated for 40% of the implementation sessions. The average interobserver agreement across researchers was 91%. A coding system was developed to analyze the notes taken during the Web-based observations. The basic unit of analysis in this coding system is the codeable unit. On receiving the field notes from the research assistants, two graduate students reviewed the protocols and identified which statements or group of statements could be considered a codeable observation unit. Each graduate student independently rated the field notes. Across the ratings, there was 98% agreement on what behaviors and statements could be considered a codeable unit. Statements in each of the protocols were numbered sequentially, beginning with number 1. Each codeable unit was a distinctly identifiable description of a particular action or statement (see Table 4 for more information on the coding protocol). The purpose of the coding system was to reliably and systematically categorize the motivational behaviors in the experimental group. For the control group, we only collected enough observation data to make sure the control intervention was being implemented as desired. For the purposes of the current presentation most of these data from the control group were not analyzed.

The coding process involved using both manual coding and Microsoft Word to organize the data into "tree-like structures" and moving toward increased specificity. Ultimately, themes were identified by ideas that occurred repetitiously. The qualitative analysis began with 10 broad initial codes that included education, ethnicity, peer groups, interests, computer interaction, learning style, language, computer-perceptions, values, and gender. The coding proceeded until core categories emerged to the point of saturation (i.e., where further analysis does not elicit new themes). Coding disagreements were settled by discussion and consensus

Table 4. Code Book for Motivation Behaviors

Code Motivational Behavior	Field note statement/element
1	Engagement/Remain on Task
2	Frustration with computer
3	Frustration with Web-based curriculum
4	Cooperation with peers
5	Competing with peers
6	Enjoyment (pleasure, laughing, dancing, singing, clapping)
7	Reaction to cultural behavior or expression
8	Initiation of cultural behavior or expression
9	Reaction to verbal praise
10	Initiation of verbal praise
11	Reaction to instructional content
12	Initiation of instructional content
13	Acknowledgment from teacher
14	Acknowledgment from researcher
15	Acknowledgment from peer
16	Acknowledgment from Web-based curriculum
17	Carry-over exploration/curiosity
18	Request for content review
19	Request for time extension
20	Request for termination

between the authors and the two research assistants. The final themes revolved around the concepts of enjoyment, acknowledgment, cultural relevance, and competition.

Enjoyment

Researchers noted repeatedly high levels of involvement and enthusiasm exhibited by the students toward the *Reading Upgrade* program. Rather than finding that enthusiasm waned, researchers noted several students requesting extra time with the program before and after the session to work on the next level. Field notes documented numerous occasions of students arriving 20 minutes

before the activity began and pounding on the computer lab door demanding entry to start *Reading Upgrade.* A few students also requested to use *Reading Upgrade* on their home computers. However, no student requests for additional time on *Reading Upgrade* outside of the controlled study were granted. Students were reported to have spent their time productively on level advancement. Most students remained attentive during the instructional portion of the level. Some students would disengage if the loading time between instructional portion and game portion took more than a few seconds. If tasks on a certain level were perceived as too simple (e.g., letter sounds), some students would request skipping a level. Otherwise most students actively engaged in both the instructional and game portions of the lessons. Researchers encouraged students to wear their headphones during the activity, however many preferred not to use them and opted to play the program with the volume low. Students remained on task with or without the headphones. Many students were reported to sing aloud and move their heads to the music. The following are examples of student engagement that emerged directly from the language of the research observers notes:

> 1. "The first thing that caught my attention was that Ayana had a smile on her face. I told myself that I didn't remember seeing her smile before that day. She was also mouthing the words of the song, "Sight words, sing and say and remember, Sight words! Oh yeah!" She was playing the game where you pick the two-letter ending for a word. I watched as she listened to the word and picked the appropriate ending. She seemed to be doing really well. . . . At that moment, Tyrone (pseudonym) yelled something out and Candy (pseudonym) told Tyrone to be quiet. She then told me that Tyrone "even shakes his butt on the playground." We both laughed at her statement and I asked her to unplug her headphones so I could hear and follow along with her. I watched for a few seconds, and she appeared to be doing well. I asked her if she liked the song that was playing and she replied, "I love it!" We both laughed again." (3/18/03-TF)

> 2. "I believe that when Tyrone started singing along is when the rest of the room started livening up. He sung along with the software very loudly. He moved quite a lot in his seat. He cheered when he got an answer right. He yelled that he got an answer right without even looking at the screen. At one point he leaned back in his chair like how some men lean back when they are driving. He was bobbing his head to the music on the software." (2/26/03-TF)

> 3. "The first thing that I noticed about the computer lab was that the door was locked from the outside. Once I was let in, I saw the children sitting at their desks, all appearing to be well engaged. I didn't notice any slouching in the chairs, instead, they sat upright [with headphones on] and appeared to be interested in what they were doing, they did not even spend time looking at me to see who the new person was. I would expect this from kids." (5/7/03-AW)

Acknowledgment

Researchers noted an overwhelming positive attitude from teachers and administrators toward the *Reading Upgrade* program. Those who visited during the Web-based curriculum sessions perceived the program to be very effective particularly in the area of phonetic awareness. Additionally, field notes documented teachers' comments of changes in students' behavior in their own classroom which they attributed to participation in the *Reading Upgrade* program. Some of the comments from teachers included increase of cooperation, risk taking, and oral reading by students. The following are examples of teacher perceptions that emerged directly from the language of the research observers notes:

1. "Today the vice-principal came to the session. He thought the *Reading Upgrade* was an excellent tool for teaching students how to decode words. He shook his head and tapped his foot to the music on level 16 with the Jamaican theme. He said my son would enjoy this." (2/35/03-TF)

2. "Shawn was one of those students who makes you work real hard—you know what I mean? Since he's been going to the computer club his behavior has improved and he is willing to participate in read-alouds. He takes risks to sound out unfamiliar words—Mrs. V Gr. 3." (3/19/03-JC)

3. "I have students getting involved that were not before." (4/15/03-JC)

Cultural Relevance

Particular components of the *Reading Upgrade* program (e.g., music genre, graphics, and language and vernacular) appealed to the participating students, the majority of which were African American and Latino. The *Reading Upgrade* program was designed with the cultural identities of the majority of struggling readers in mind by using familiar language (i.e., "praise-words" and "catch phrases") in both English and Spanish and music (e.g., rap/hip-hop lyrics and beats) throughout the program. Although no quantitative differences in performance among ethnicity were foumd between African American, Latino, Anglo, or Asian students, observations suggest marked unlikeness among the students while interacting with the program. For example, Latino students were much more aware and responsive to the Spanish phrases used during transition from one level to the next, while African American students were reported to respond very positively to the music and hip/hop lyrics. Research assistants observed all students awareness to the darker hue of the animated characters. The video game-like environment and graphics were noted to be very meaningful to all the students. The following are examples of cultural responsiveness that emerged directly from the language of the research observers notes:

1. "I decided to sit next to Veronica today. She was excited to be on level nine." . . . 'Yes I got 100 points.' She leaned over to Justine and told her that she was finished in Spanish. I understood enough to figure out that's what

she was saying. Both girls and the computer said, Hasta Luego level 9 at the same time. We all laughed together. Veronica said that's so cool. I knew that she was referring to how the game used Spanish." (2/26/03-JC)

2. "Billy did not wear headphones. I did not see him physically responding to the music . . . John (pseudonym) said can I turn the music off. I just want to play the games." (3/5/03-RH)

3. "When all the students were logged in and working, I began to pay closer attention to the students. Tyrone was dancing in his chair, singing along loudly with the soflware. It was loud enough to be heard across the room where I was standing. In between singing with the software, he sang "In da Club" a popular song on the radio and at another point he began singing a Michael Jackson song (I don't know which one exactly). The three songs turned into one continuous song. He kept moving the entire time." (2/25/03-TF)

Competition

Students were preoccupied not only with their own progress through the *Reading Upgrade* lessons but also the progress of their peers. Researchers repeatedly observed students comparing levels or racing with their peers to reach the next level. This behavior was equally observed with both male and female students across ethnicity. The following are examples of competition that emerged directly from the language of the research observers notes:

1. "Tyrone . . . at times, he would get up out of his seat and ask Andy (pseudonym) what level he was on. If one of the adults were nearby, he would ask the adult what level Andy was on." (3/5/03-RH)

2. "We were all shocked when Tyrone had figured out a secret password on the keyboard and decided to cheat and bump up his level. I asked him why he did it, he said that he wanted to be the first one done . . . he was returned to the correct level." (3/5/03-JC)

3. "First I observed Gus (pseudonym) and Billy (pseudonym), as they sat together at one of the computer islands. Gus and Andy started at level 14. Gus was staring intensely at the computer screen. I saw his eyes moving along each line. When he would get a correct answer, he would nod his head. . . . Once he completed a level, he would immediately look over at Brian's computer screen. Gus would look at Billy until they made eye contact and hold up his fingers (15). . . . Billy was also stariing at his screen and would occasionally look over at Gus' screen. Billy and Gus kept racing during the session." (3/5/03-RH)

4. "All of the students starting yelling out which level they were working on. When I got to Justin's computer he told me that he was upset because he was on the wrong level. He said that he was on level 28 but was supposed to be on Level 31. I believe that Dr. Smith checked the list from the day before and verified that he was on level 28. He seemed upset but kept working. Later on, I

> heard him say, ”This sucks." I asked why and he replied, “Because I did this already.” I told him that I was sorry and just keep on working. Shortly after that, I went to check on Jenny and she told me that she was also on the wrong level. She was currently on level 18 but she said that she was supposed to be on level 21. I did remember her working on level 18 the day before and it was well before the session was over. Dr. Smith verified the list and said that she [the student] was supposed to be on level 18.” (3/19/03-TF)

DISCUSSION

The purpose of this study was to investigate the effects of Web-based reading curriculum on reading performance and motivation. We created an experimental intervention consisting of a Web-based reading program, *Reading Upgrade,* which incorporated music and video to provide lessons on decoding, phonemic awareness, fluency, and comprehension. We contrasted this Web-based curriculum with a control intervention. Our control intervention lacked computers and consisted of conventional reading instruction practices based on the *Direct Reading Instruction* model. We predicted that participation in the Web-based program would significantly improve children’s reading skills and our results appear to corroborate this prediction. The analysis of reading performance, pre- post-test scores in the experimental and control groups, indicates significant increases in measures of decoding, fluency, and comprehension for the experimental group. We conclude from these findings that *Reading Upgrade* promotes the development of reading competence in these three areas. Participants in the experimental group made gains equivalent to one grade-level after receiving 8-weeks of Web-based instruction. Whether greater gains could be achieved by an extended curriculum period is worth exploration. Also in the current study, three dimensions of reading motivation, Reading Avoidance, Recognition for Reading, and Reading Satisfaction were explored. A negative relationship was foumd between the Recognition and Avoidance subscales and performance. This finding suggests for the *Reading Upgrade* participants, that low performing readers were more likely to avoid reading activities and seek recognition for reading activities than high performing readers. The *Reading Upgrade* course is laden with extrinsic rewards such as points and certificates. These extrinsic rewards may be essential to initiating reading engagement with a child who is struggling to read. The literature regarding reading motivation revealed students are motivated to read by various intrinsic and extrinsic factors that go beyond reading to acquire school knowledge of academic texts (Alverman, 2001; Wigfield & Guthrie, 1997). The Satisfaction subscale was not significantly associated with performance. The Satisfaction dimension refers to the enjoyment of different literary texts. While *Reading Upgrade* provides a variety of texts in the comprehension section of the curriculum, it may not be extensive enough to produce a statistical difference on the Satisfaction subscale

of Reading Motivation. Closer examination of the measure is needed to better understand this outcome. However, it is noteworthy that none of the reading motivation subscales were significantly correlated to performance for the control group. This suggests that students' increased level of reading motivation is more likely to be related to the *Reading Upgrade* program than conventional reading instruction methods.

While our experimental data demonstrated a significant change in reading performance and significant relationship between performance and motivation for children in the experimental group, they do not lend insight into the mechanisms through which this change occurred. One way to uncover these mechanisms is to examine our qualitative data on reading motivation. For instance, our observations of children's motivation and engagement in the experimental group indicate that children participated in the Web-based environment with levels of confidence and familiarity. Analysis of observation field notes impressively revealed distinct patterns of student engagement, competition, and cultural responsiveness in our ethnically diverse sample of students. Students had a positive experience with *Reading Upgrade* and wanted to extend their time in the program. They were engaged and motivated to read by the popular/hip-hop music and word repetitions during instructional portions of the levels. According to Smith, Chapnik, and Besner (2000), word repetition facilitates acquisition of new words for struggling readers. In many conventional reading curriculums, it is not uncommon for words and phrases to appear once or twice and a student may follow a story for long periods before seeing the same word again. Thus, the student is not getting the beneficial effect of repeated exposure of a word. In *Reading Upgrade,* words are repeated in a quick succession with captivating graphics, facilitated by multi-ethnic characters. Furthermore, students responded well to the use of Spanish phrases and other youth vernacular. The use of a point system and graduating levels created a competitive environment for the students, which motivated them to quickly advance through each lesson. Finally, teachers' reports of reading and behavior improvements as a result of participating in *Reading Upgrade* are striking and sustain the effectiveness of the curriculum.

To understand these interesting observed behaviors during the experimental group, we will return to the concept of contextualized learning environments (Gallego & Cole, 2000; Gee, 1999; Lave & Wenger, 1991; Pinkard, 2001; Rogoff et al., 2001). As discussed above, contexualized learning occurs when education is situated in meaningful real-world tasks. These authors argue that an authentic task, activity, or goal makes learning more profound by placing the student in the center of the domain context and culture. Creating a context in which struggling students are motivated to learn to read is difficult, yet possible. The Web-based envirommment of *Reading Upgrade* does this exactly and provides opportunities to decode words or understand text while engaging in tasks, such as shopping in the mall, or withdrawing money from the automatic bank teller machine. All of this

instruction and reading activities are conducted with the accompaniment of music relevant today in the culture of many youth. Connecting reading assignments to real-world experiences is one proven method to successfully develop literacy skills. The Web-based learning environment shows that student motivation is increased by two main features of the instruction: meaning-centered reading program and a student responsive culture that emphasizes what students have to say and their need for self-expression (Atwell, 1998; Ivey & Broaddus, 2001; Oldfather, 1993).

Limitations

While the findings are very promising, there are limitations in this study. The main limitation is sample size. Only one school, one grade level, and thus a relatively small pool of struggling readers were used. Also due to the high transient rate of students in low-income schools, we lost eight children (20%), and this loss was selective as five of the eight were from the experimental group. Furthermore, the experimental and control groups were nonequivalent with regards to ethnic composition. Another limitation was the lack of additional reading outcome measures. While both the DRA and WRAT-3 are reliable assessments, there are arguably more sensitive reading outcome measures, such as the Gray Oral Reading Test, that were not accessible to authors at the time of the study due to circumstances beyond control, See Appendix A. Additionally, lack of a computer tracking mechanism to monitor student performance on each content area of is a shortcoming in the study. The findings might prove more powerful if a running record of correct and incorrect responses on each level of reading content (e.g., phonemic awareness) within the *Reading Upgrade* program was available at the time this study was conducted. This information would be extremely valuable to teachers and researchers alike desiring specific information on students' problem reading areas. Future evaluations would benefit greatly by including data from this tracking mechanism feature.

In light of these limitations our findings should be considered as suggestive rather than conclusive. Further research should address these limitations and replicate the results of the study to increase external validity and generalizability. However in the interim, while we wait for more rigorous evaluation of this curriculum, there is certainly enough empirical evidence from this study to encourage curriculum designers and educators to consider Web-based environments like, *Reading Upgrade,* as tools to improve the reading and motivation outcomes of children who are struggling to read. *Reading Upgrade* appears to be a realistic curriculum approach because it is culturally responsive and Web-based which affords wide classroom deployment. It is possible for other Web-based programs to achieve the same results if they consider the cultural background and everyday practices of the learner.

APPENDIX A
Reading Test Scores and Equivalent Grade Levels

WRAT-3	DRA	Grade/reading equivalent
0-12	N/A	Pre-school
13-18	A, 1, 2	Kindergarten
19-23	3, 4, 6, 8, 10, 12, 14, 16, 18	First
24-27	20, 24, 28	Second
28-32	30, 34, 38, 40, 44	Third

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REFERENCES

Adams, M. J. (1990). *Beginning to read: Thinking and learning about print.* Cambridge, MA: MIT Press.

Allen, B. A., & Boykin, A. W. (1992). African-American children and the educational process: Alleviating cultural discontinuity through prescriptive pedagogy. *School Psychology Review, 21,* 586-597.

Allen, B. A., & Butler, L. (1996). The effects of music and movement opportunity on the analogical reasoning performance of African American children and white school children: A preliminary study. *Journal of Black Psychology, 22,* 316-328.

Alverman, D. E. (2000). Narrative approaches. In M. L. Kamil, P. B. Mosenthal, P. D. Pearson, & R. Barr (Eds.), *Handbook of reading research* (Vol. III). Mahwah, NJ: Lawrence Erlbaum Associates. ED451473.

Alverman, D. E. (2001). Reading adolescents' reading identities: Looking back to see ahead. *Journal of Adolescent & Adult Literacy, 44,* 676-690.

Atwell, N. (1998). *In the middle: New understandings about writing, reading, and learning* (2nd ed.). Portsmouth, NH: Boynton/Cook.

Au, K. H. (2000). A multicultural perspective on policies for improving literacy achievement: Equity and excellence. In M. L. Kamil, P. B. Mosenthal, P. D. Pearson, & R. Barr (Eds.), *Handbook of reading research* (Vol. III, pp. 835-851). Mahwah, NJ: Erlbaum.

Baker, L. (1999). Opportunities at home and in the community that foster reading engagement. In J. T. Guthrie & D. Alvermann (Eds.), *Engagement in reading: Processes, practices, and policy implications* (pp. 105-133). New York: Teachers College Press.

Bean, T. W., & Readence, J. E. (2002). Adolescent literacy: Charting a course for successful futures as lifelong learners. *Reading Research and Instruction, 41*(3), 203-210.

Beaver, J. (1998). *Developmental reading assessment.* Glenview, IL: Celebration Press.

Boykin, A. W., & Allen, B. A. (1988). Rhythmic-movement facilitation of learning in working-class Afro-American children. *Journal of Genetic Psychology, 149,* 335-347.

Boykin, A. W., & Cunningham, R. T. (2001). The effects of movement expressiveness in story content and learning context on the cognitive performance of African American children. *The Journal of Negro Education, 70*(1/2), 72-83.

Boykin, A. W., Tyler, K. M., & Miller, O. (2005). In search of cultural themes and their expressions in the dynamics of classroom life. *Urban Education, 40*(5), 521-549.

Brunner, J. S. (1996). *The culture of education.* Cambridge, MA: Harvard University.

Campbell, J. R. (1996). *NAEP 1994 reading report card for the nation and the states: Findings from the national assessment of educational progress and trial state assessment.* Washington, DC: National Library of Education, Office of Educational Research and Improvement, U.S. Department of Education.

Chall, J. (1989). Learning to read: The great debate 20 years later: A response to "Debunking the great phonics myth." *Phi Delta Kappan, 70,* 521-538.

Clay, M. M. (1985). *The early detection of reading difficulties* (3rd ed.). Portsmouth, NH: Heineman.

Cole, J. (2000). Intrinsic motivation to read: A case study of the literacy personalities of four second grade readers. *Dissertation Abstracts International Section A: Humanities and Social Sciences, 61*(6-A), 2237.

Cole, J. M. (2001). The effects of music type, movement opportunity on the cognitive task performance and mood state of African American school children. (Doctoral dissertation, Howard University, 1996). *Dissertation Abstracts International, 61*(6-B), 4445.

Cole, M. (1996). *Cultural psychology: A once and future discipline.* Cambridge, MA: Belknap Harvard.

Denton, C.A., & Mathes, P. G. (2003). Intervention for struggling readers: Possibilities and challenges. In B. Foorman (Ed.), *Preventing and remediating reading difficulties: Bringing science to scale* (pp. 229-251). Timonium, MD: York Press.

Farkas, G., & Vicknair, K. (1996). Reading one-one. In *Human capital or cultural capital* (pp. 151-175). New York: Aldine de Gruyter.

Fisher, D. (2001). "We're moving on up": Creating a schoolwide literacy effort in an urban high school. *Journal of Adolescent and Adult Literacy, 45*(2), 92-101.

Foorman, B. R. (1995). Research on "The Great Debate": Code-oriented versus whole-language approaches to reading instruction. *School Psychology Review, 24,* 376-392.

Foorman, B. R., Francis, D. J., Fletcher, J. M., Winikates, D., & Mehta, P. (1997). Early intervention for children with reading problems. *Scientific Studies of Reading, 1,* 225-276.

Foorman, B. R., Francis, D. J., Fletcher, J. M., Schatschneider, C., & Mehta, P. (1998). The role of instruction in learning to read: Preventing reading failure in at-risk children. *Journal of Educational Psychology, 90,* 37-55.

Gallego, M., & Cole, M. (2001). Classroom cultures and cultures in the classroom. In V. Richardson (Ed.), *Handbook of research on teaching.* Washington, DC: American Educational Research Association.

Garcia, G. E. (2000). Bilingual children's reading. In M. L. Kamil, P. B. Mosenthal, P. D. Pearson, & R. Barr (Eds.), *Handbook of reading research* (Vol. 3, pp. 813-834). Mahwah, NJ: Erlbaum.

Gee, J. P. (1999). Reading and the new literacy studies: Reframing the National Academy of Sciences Report on reading. *Journal of Literacy Research, 31*(3), 355-374.

Glaser, B., & Strauss, A. (1967). *The discovery of grounded theory.* Chicago, IL: Aldine Publishing Co.

Goodman, Y. M., & Goodman, K. S. (1990). Vygotsky in a whole language perspective. In L. C. Moll (Ed.), *Vygotsky and education: Instructional implications on applications of sociohistorical psychology* (pp. 223-250). New York: Cambridge University Press.

Gregory, E., Long, S., & Volk, D. (2004). *Many pathways to literacy: Young children learning with siblings, grandparents, peers, and communities.* New York: RoutledgeFarmer.

Griffin, S., & Cole, M. (1987). New technologies, basic skills, and the underside of education: What's to be done? In J. Langer (Ed.), *Language, literacy, and culture: Issues of society and schooling.* Norwood, NJ: Ablex.

Guthrie, J. T., & Davis, M. H. (2003). Motivating struggling readers in middle school through an engagement model of classroom practice. *Reading and Writing Quarterly, 19,* 59-85.

Gutierrez, K. D., Asato, J., Pacheco, M., Moll, L., Olson, K., Horng, E. L., et al. (2002). "Sounding American": The consequences of new reforms on English language. *Reading Research Quarterly, 37*(3), 328-343.

Hamilton, D., MacDonald, B., King, C., Jenkins, D., & Parlett, M. (1977). *Beyond the numbers game.* London: Macmillan Education Ltd.

Hakuta, K. (1999). The debate on bilingual education. *Journal of Developmental & Behavioral Pediatrics, 20*(1), 36-37.

Hart, B., & Risley, T. R. (1995). *Meaningful differences in the everyday experience of young American children.* Baltimore: Brookes.

Heath, S. (1983). *Ways with words.* Cambridge: Cambridge University Press.

Hilliard, A. G. III (1995). Either a paradigm shift or no mental measurement: The non-science and non-sense of the bell curve. *Psychological Discourse, 76*(10), 620.

Invernizzi, M., Juel, C., & Rosemary, C. A. (1997). A community volunteer tutorial that works. *The Reading Teacher, 50*(4), 304-311.

Ivey, G., & Broaddus, K. (2001). Tailoring the fit: Reading instruction and middle school readers. *The Reading Teacher, 54,* 68-78.

Jimenez, R. T. (2003). Literacy and Latino students in the United States: Some considerations, questions, and new directions. *Reading Research Quarterly, 38*(1), 122-128.

Jonassen, D. (1995). Supporting communities of learners schools. *Educational Technology, 35*(4), 60-63.

Kamil, M. L., & Intrador, S. (1997). *Quantitative Trends in Publication of Research on Technology and Reading, Writing, and Literacy.* Scottsdale, AZ: The National Reading Conference.

Kearsley, G. (1998). *A guide to online education* [On-line Web page]. Available online at: http://fcae.nova.edu/~kearsley/online.html.

Kozulin, A. (2002). Sociocultural theory and the mediated learning experience. *School Psychology International, 23*(1), 7-35.

Labov, W. (1995). Can reading failure be reversed: A linguistic approach to the question. In V. Gadsen & D. Wagner (Eds.), *Literacy Among African-American Youth: Issues in Learning, Teaching and Schooling* (pp. 39-68). Cresskill, NJ: Hampton Press.

Labov, W. (2003). When ordinary children fail. *Reading Research Quarterly, 38*(1), 36-49.

Lave, J., & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation.* Cambridge, England: Cambridge University Press.

Learning Upgrade. (2000). *Reading Upgrade: Web-based reading curriculum program.* La Jolla, CA. Available from Reading Upgrade Web site, http://www.readingupgrade.com.

Lee, C. D. (1995). A culturally based cognitive apprenticeship: Teaching African American high school students skills in literary interpretation. *Reading Research Quarterly, 30*(4), 608-630.

Lee, C. D. (2000). Unpacking culture, teaching, and learning: A response to "The Power of Pedagogy." In W. Watkins, J. Lewis, & V. Chou (Eds.), *Race and education: The roles of history and society in educating African American students* (pp. 89-91). Needham Heights, MA: Allyn and Bacon.

Lee, C. D. (2001). Is October Brown Chinese? A cultural modeling activity system for underachieving students. *American Educational Research Journal, 38,* 97-141.

Lonigan, C. J., & Whitehurst, G. J. (1998). Examination of the relative efficacy of parent and teacher involvement in a shared-reading intervention for preschool children from low-income backgrounds. *Early Childhood Research Quarterly, 17,* 265-292.

Lyon, R., & Fletcher, J. M. (2001). Early warning system. *Education Matters,* Summer, 23-29.

McCardle, P., Scarborough, H. S., & Catts, H. W. (2001). Predicting, explaining, and preventing children's reading difficulties. *Learning Disabilities Research & Practice* [Special issue]. *Emergent and early literacy: Current status and research directions, 16*(4), 230-239.

Meacham, S. J. (2001). Vgotsky and the blues: Re-reading cultural connections and conceptual development. *Theory into Practice, 40*(3), 190-197.

Miles, M., & Huberman, A. (1984). *Qualitative data analysis.* Beverly Hills, CA: Sage.

Moje, E. B. (2002). Re-framing adolescent literacy research for new times: Studying youth as a resource. *Reading Research and Instruction, 41*(3), 229-246.

Moll, L. C. (2000). Inspired by Vgotsky: Ethnographic experiments in education. In C. Lee & P. Smagorinsky (Eds.), *Vgotskyian perspectives on literacy research: Constructing eaning through collaborative inquiry* (pp. 256-268). New York: Cambridge University Press.

National Center for Education Statistics. (2000). *The condition of education in brief 2000.* (Publication No. NCES 2001045). Washington, DC: U.S. Department of Education.

National Reading Panel (NPR). (2000). *Report of the National Reading Panel.* Washington, DC: National Institute of Child Health and Human Development.

NICHD (National Institute of Child Health and Human Development). (2000). *Report of the National Reading Panel: Teaching children to read.* Washington, DC: U.S. Department of Health and Human Services.

Oldfather, P. (1993). What students say about motivating experience and whole language classroom. *The Reading Teacher, 46,* 672-681.

Pinkard, N. (2001). "Rappin' Reader" and "Say Say Oh Playmate." Using children's childhood songs as literacy scaffolds in computer-based learning environments. *Journal of Educational Computing Research, 25*(1), 17-34.

Pinnell, G. S., Degord, D. E., & Lyons, C. A. (1988). *Reading recovery: Early intervention for at-risk first graders.* ERS Monograph. Arlington, VA: Educational Research Service.

Rogoff, B., Turkanis, C. G., & Bartlett, L. (2001). *Learning together: Children and adults in a school community.* New York: Oxford University Press.

Rogoff, B. (2003). *The cultural nature of human development.* London: Oxford University Press.

Rueda, R., Monzó, L. D., & Arzubiaga, A. (2003). Academic instrumental knowledge: Deconstructing cultural capital theory for strategic curriculum approaches. *Current Issues in Education* [On-line], *6*(14). Available online at: http://cie.ed.asu.edu/volume6/number 14/

Savery, J. R., & Duffy, T. M. (1995). Problem based learning: An instructional model and its constructivist framework. In B. G. Wilson (Ed.), *Constructivist learning environments: Case studies in instructional design* (pp. 135-148). Englewood Cliffs, NJ: Educational Technology Publications.

Serpell, R., & Boykin, A. W. (1994). Cultural dimensions of cognition: A multiplex, dynamic system of constraints and possibilities. In R. J. Sternberg (Ed.), *Thinking and problem solving. Handbook of perception and cognition* (2nd ed., pp. 369-408). San Diego, CA: Academic Press.

Shweder, R. (1999). Why cultural psychology. *Ethos, 27*(1), 62-73.

Slavin, R., & Cheung, A. (2004). How do English language learners learn to read? *Educational Leadership, 61*(6), 52.

Smith, L. (1978). An evolving logic of participant observation, educational ethnography and other case studies. In L. Shulman (Ed.), *Review of research in education.* Itaska, IL: Peacock.

Smith, M., Chapnik, M., & Besner, D. (2000). On the interaction between linguistic and pictorial systems in the absence of semantic mediation: Evidence from a priming paradigm. *Memory & Cognition, 28*(2), 204-213.

Snow, C. E., Burns, M. S., & Griffin, P. (Eds.). (1998). Committee on the Prevention of Reading Difficulties in Young Children, National Research Council: *Preventing reading difficulties in young children.* Washington, DC: National Academy Press.

Swanson, H., Hoskyn, M., & Lee, C. (1999). *Curriculums for students with learning disabilities: A meta-analysis of treatment outcomes.* New York: Guilford Press.

Tharp, R. G. (1989). Psychocultural variables and constaints: Effects on teaching and learning in schools. Special Issue: Children and their development: Knowledge base, research agenda, and social policy application. *American Psychologist, 44*(2), 349-359.

Tharp, R. G., Estrada, P., Dalton, S. S., & Yamauchi, L. A. (2000). *Teaching transformed: Achieving excellence, fairness, inclusion, and harmony.* Colorado: Westview Press.

Torgesen, J. K., Morgan, S., & Davis, C. (1997). Effects of two types of phonological awareness training on word learning in kindergarten children. *Journal of Educational Psychology, 84,* 354-370.

Vadasy, P. F., Jenkins, J. R., Antil, L. R., Wayne, S. K., & O'Connor, R. E. (1997). Community-based early reading curriculum for at-risk first graders. *Learning Disabilities: Research and Practice, 12,* 29-39.

Valsiner, J., & van der Veer, R. (2000). *The social mind: Construction of the idea.* Cambridge, UK: Cambridge University Press.

Wertsch, J. V. (1998). *Mind as Action.* New York: Oxford University Press.

Wilkinson, G. (1993). *Wide Range Achievement Test, 3rd Edition.* Wilmington, DE: Wide Range, Inc.

Wigfield, A., Guthrie, J. T., & McGough, K. (1996). *A questionnaire measure of children's motivation for reading (Instructional Resource No. 22).* Athens, GA: National Reading Research Center, University of Georgia and University of Maryland.

Wigfield, A., & Guthrie, J. (1997). Relations of children's motivation for reading to the amount and breadth of their reading. *Journal of Educational Psychology, 89,* 420-432.

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