

**Should Four-Year Olds Use Computers to Develop Emergent Literacy Skills?: A Study of
the Waterford Early Reading Program**

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Children's performance in regards to early literacy is seen as foundational and essential for later academic success (Kamil, Mosenthal, Pearson, & Barr, 2000; Snow, Burns, & Griffin, 1998). In fact, there is evidence to suggest that children who are unable to acquire emergent literacy skills, as understood by Clay (1967), may remain at-risk throughout their future schooling (Shaywitz, 2004). Knowing the importance of developing early literacy, and the growing pressure on the early childhood education community to be accountable for addressing this imperative, the question becomes, "How can we support students in developing emergent literacy?"

A number of factors have been commonly identified in the literature as contributing to early literacy development. Elliott and Olliff (2008, p. 551) state, "A child's knowledge of the alphabet is the single best predictor of first-year reading success (Adams, 1990) and the most powerful predictor of later reading success (Honig, 2001)." In addition to alphabetic knowledge, the National Early Literacy Panel has recognized phonological and phonemic awareness, print knowledge, oral language development, and invented spelling as predictors of future literacy success (Strickland & Shannan, 2004). Furthermore, it is understood that a student's ability to learn how to read is highly influenced by interactions with well-trained teachers and informed parents (Wood, Bruner, & Ross, 1976).

Some preschoolers come from homes with engaged adults and rich literacy environments, already knowing about reading and writing (e.g. Sulzby, 1985), while many others, have extremely limited exposure to literacy. Early childhood educators may have difficulties therefore, in attempting to compensate for home environments which do not foster emergent literacy, and differentiating reading instruction in an effort to meet the needs of all students (e.g.

Dooley, 1993). While currently under researched (Kamil & Lane, 1998; Tracey & Young, 2007), a technologically-focused approach to differentiating instruction, such as employing an Integrated Learning System (ILS), may prove effective in developing emergent literacy.

For the purposes of this study ILS is defined as a computer management system that assesses students and places them in an individualized sequence of lessons appropriate to their learning level (Becker, 1992; Maddux & Willis, 1992). There are a variety of ILSs that focus directly on emergent literacy skills such as phonological awareness, alphabetical principles, word identification, and basic concepts of print. The present study will focus on a particular ILS, Waterford Early Reading Program Level 1 (WERP-1). WERP-1 software assists in developing the above-mentioned skills through stories, songs, and rhymes.

Regardless of WERP-1's worthy objectives, there is controversy concerning the effectiveness of ILSs in general and WERP-1 in particular. Sherry (1990) suggests that while ILSs are popular with students, teachers and administrators, "these perceptions were usually based on gut feelings rather than on any hard data" (p.119, as cited in Paterson, Henry, O'Quin, Cetrano, & Blue, 2003). In regards to WERP-1, evidence from one published study, and at least two unpublished evaluations, show that WERP-1 computer usage (controlling for initial skills) is strongly related to emergent literacy outcomes (Hecht & Close, 2002). Paterson, et al. (2003), however, found that WERP-1 had no effect on students' emergent literacy.

As one can see, there is contradictory evidence regarding WERP-1, a program which entails a great investment of curricular time and money. According to a *District Administrator* survey, projected current year district expenditures on technology for the 2006–2007 school year

were \$4.32 billion (Dyrli, 2007). Moreover, technological resources are often oversold to schools and underused by teachers (Cuban, 2001).

With the current state of our economy, President Obama's focus on improving early childhood education, and the need to educate an increasing number of English Learners (EL), it is important for early childhood programs to consider the best way to allocate their limited dollars and instructional time. This study with its focus on the impact of WERP-1 on pre-kindergarten students and on educators' perceptions of WERP-1 can inform practitioners, decision makers, and the academic community. Specifically, the present study investigates (1) What are the effects of WERP-1 on the early reading development of these pre-kindergarten students? and (2) What are teachers' and site principals' attitudes toward using WERP-1?

Methods

Site Selection Criteria

Participants were drawn from twelve classes at six preschool sites in the same school district. All sites included preK classrooms with students who possessed relatively low test scores, and used Houghton Mifflin's Pre-K text, "Where Bright Futures Begin!" There were morning and afternoon classes at the six sites with approximately 20 students per class. The three treatment sites each had two computers equipped with WERP-1 software, and employed teachers who were interested in using WERP-1 and willing to fully participate in all components of the study.

Additional site selection criteria included: 1) there were no other language arts supplemental curricula (in addition to the Houghton Mifflin) being utilized and 2) the student

populations of the schools chosen were similar in socio economic status 3) analysis confirmed that the sites were similar in regards to ELs, and students with Individualized Educational Programs (IEPs).

Participants

Given that students were not randomly assigned to classes, the research design was based on a quasi-experimental design (QED). Therefore, the term “comparison” rather than “control” will be used for the classes who did not receive the treatment (WERP-1).

Descriptive statistics are provided in Table 1 for each condition with respect to gender, English language proficiency status, and age. Chi square analyses suggest the groups were not significantly different with respect to gender [$\chi^2(1, N=198) = .062, p = .803, 2\text{-tailed}$] nor language proficiency status [$\chi^2(1, N=197) = .009, p = .924, 2\text{-tailed}$]. T-tests for independent samples suggest the groups were not significantly different with respect to age [$t(196) = -1.64, p = .103, 2\text{-tailed}$] nor receptive vocabulary skills (as measured by the Peabody Picture Vocabulary Test-III (PPVT)) [$t(196) = -0.19, p = .853, 2\text{-tailed}$]. The groups also did not differ with respect to receipt of special education services (as indicated by having IEPs) nor grade retention status.

One hundred ninety-eight students (86 Treatment and 112 Comparison) were included in the final sample. All participants were eligible to enroll in kindergarten the following year (i.e., turning five years of age by December 2) and 57% were Limited English Proficient (LEP). Table 1 displays demographic information in regards to gender, English language proficiency status, and age for the treatment and comparison groups.

Table 1

Summary of Participant Characteristics by Condition

Participant Characteristic	Treatment (n=86)		Comparison (n=112)	
	N	%	n	%
Gender				
Male	43	50	54	48
Female	43	50	58	52
English Language Proficiency Status				
<i>Unknown</i>	0	(0)	1	(<1)
Non-LEP	37	43	47	42
LEP	49	57	64	58
Age (as of December 2, when child must be 5 to enter a public kindergarten class in the same state)				
	M	SD	M	SD
	5.47	.31	5.48	.28
Receptive vocabulary skills				
(as measured by the PPVT-III standard scores in Fall)	70.98	18.26	75.35	18.85

Fidelity. To ensure fidelity, student usage reports, detailing minutes of use, were printed through the WERP-1 software program and faxed weekly to the director. Only students who had WERP-1 usage times of over 1000 minutes were included in the final analysis.

Teacher characteristics. There were seven teachers who participated in the study. All teachers were females and had a minimum of an Associate of Arts degree. Five of the teachers were Caucasian while one was African American and two were Asian American.

The teachers had varying degrees of education. One teacher had an Associate of Arts degree and 30 years teaching experience. Six teachers possessed Bachelors Degrees, had one to two years experience, and all but one was in her first year of working for the school district. Of those who had Bachelors degrees, three possessed teaching credentials, and one was in the process of completing the apprenticeship (student teaching) portion of receiving her credential.

Curricula

The School District used the Houghton Mifflin Pre-K text, “Where Bright Futures Begin!” as their primary curriculum and supplemented treatment students’ language arts instruction with WERP-1. The only portion of the WERP-1 curriculum that treatment teachers were required to implement was the software portion.

Comparison and treatment curriculum. All school sites used Pre-K, “Where Bright Futures Begin!” According to the marketer’s website, “This program [Houghton Mifflin’s ‘Where Bright Futures Begin!’] is a scientifically research-based ‘hands-on, minds-on’ curriculum that aligns with key critical pre-kindergarten learning goals. Alive with colorful images and rich literature, this comprehensive, integrated program provides children with the foundational skills they need to succeed as lifelong learners”

(<http://www.eduplace.com/marketing/prek/>).

Supplemental treatment curriculum. WERP-1 addresses reading readiness and emergent literacy skills in an interactive, engaging computer-based environment for twelve-minute

sessions five times per week. The program aspires to build phonological awareness and vocabulary; increase the recognition of letter names, sounds, and symbols; master basic print concepts; and provide students with experience in oral and written language through stories, songs, and rhymes.

Implementation

From October through May, each child used the WERP-1 software for twelve minutes per day five days a week. All treatment classrooms were equipped with two computers installed solely with WERP-1 software. Beginning in the morning a student's name and picture (chosen randomly by the WERP-1 software) would appear on each computer. At that point, the teacher would request that these two students begin completing WERP-1 activities at the computers. When a student's twelve-minute WERP-1 session elapsed, a picture of the next student would appear and the WERP-1 user would alert the next student verbally that it was his or her turn on the computer. The next student finds the computer that displays his or her picture, puts on the headphones, engages the mouse, and begins the WERP-1 activities for the next twelve-minute session.

This process was repeated throughout the hours of instruction for the two sessions daily (approximately 8:00 am to 12:00 pm and 1:00 pm to 5:00 pm). The only times students did not use the computers were during periods of outside play and snack time. These activities were seen as essential for students' well being (both physically and as a part of the classroom community) and therefore no computer use was required at these times. If students were absent the teacher would skip over their names when it came to their WERP-1 session and attempt to make up their

sessions upon their return by having them engage in extra sessions. At the end of each week teachers would fax student usage reports to the director to confirm fidelity regarding minutes of use.

Data Collection

Data addressing the research questions were collected via classroom observations, interviews with three treatment teachers and their site principals, as well as through a student assessment.

Classroom observations. Classroom observations were conducted for treatment teachers in the Fall (October) and Spring (May). In addition, all comparison teachers' classrooms were observed in the Fall. Classroom observation forms were used to denote activities in which students were engaged. Each observation was approximately twenty minutes in length and the purpose was to gain a better sense of instructional approaches and procedures teachers implemented in their classrooms. Observations in treatment classrooms frequently focused on the implementation of WERP-1 software and particularly student use. Furthermore, teachers were interviewed in the Spring to gain additional insights.

Interviews. Interviews were conducted in the Spring (May) with treatment teachers and site principals. These interviews garnered information regarding their attitude towards WERP-1 use, perceived strengths and weakness of the software, fidelity to usage requirements, and general feedback on WERP-1.

Assessment. The District Assessment is a developmental formative assessment designed jointly by kindergarten and preschool teachers in a central California school district. The District

Assessment was administered three times (Fall, Winter, and Spring) and scored by classroom teachers. Teachers were initially trained in administering and scoring the assessment upon employment and their training is updated annually.

The assessment includes letter naming, concepts about print, and numeracy. The researchers acknowledge a shortcoming of this assessment is that there have been no attempts to evaluate the validity or reliability. Nevertheless, this is the assessment used by the district, and preschool teachers believe it has been an effective instrument for their purposes for the past five years. Test items include writing one's name, and color and body part identification. Items that address numeracy include counting, recognizing numbers, number concepts, and shapes. To analyze students' emergent reading abilities there are items that address identifying capital and lowercase letters, and creating sounds associated with these letters. In addition students are assessed on their ability to copy symbols.

Results

Major Findings by Evaluation Question

1. What are the effects of WERP-1 on the early reading development of pre-kindergarten students?

In evaluating the impact of WERP-1, the treatment and comparison groups were compared via separate independent samples t-tests on data collected at each time point. In addition, to determine differential growth, the analysis was approached through the General Linear Model whereby Group (treatment vs. comparison) serves as the between-subjects factor and Time of Assessment (pre, mid, post) serves as a within-subjects factor. The presence of a

statistically significant interaction suggests that the change over time is not constant across the two groups.

Results indicate that using WERP-1 software for the prescribed 12-minute sessions five days a week improved the early reading development of the treatment preschool students. Specifically, the treatment group exhibited more growth in letter recognition between the pre and mid-year assessments than did the comparison group (see Table 2 below). Growth in sound identification between the mid-year to post assessments, as well as overall between the pre to post assessments was more pronounced for the treatment group than the comparison group (see Table 3 below). In addition, the treatment group exhibited more growth in the ability to copy symbols between the pre and post assessments than did the comparison group. No statistically significant difference was found between the groups in regards to students' ability to write their names or to identify colors (see Table 4).

Letter Recognition Results

As noted earlier, both the treatment and comparison groups were learning letter recognition and phonological awareness skills through Houghton Mifflin's Pre-K curriculum, "Where Bright Futures Begin!" An item on the District Assessment asked students to identify capital and lowercase letters that were presented in random order. At the midpoint District Assessment, the treatment students performed significantly higher on the letter recognition task ($p = .011$ for uppercase and $p = .005$ for lowercase). By the post-test the treatment students had lost this advantage, but it is important to note that they learned the letters earlier in the year than the comparison group students.

Table 2

Overview of District Assessment Letter Recognition Results (*p*-values are italicized).

	Did the groups differ at any point in time?			Was there differential growth? If so, which group “grew” more?		
	If so, which group did best?					
	<i>Pre</i>	<i>Mid</i>	<i>Post</i>	<i>Pre to Post</i>	<i>Pre to Mid</i>	<i>Mid to Post</i>
ABC’s Uppercase	No <i>.812</i>	Yes, Treatment <i>.011</i>	No <i>.203</i>	No <i>.190</i>	Yes, Treatment <i>.004</i>	No <i>.796</i>
ABC’s Lowercase	No <i>.689</i>	Yes, Treatment <i>.005</i>	No <i>.085</i>	No <i>.161</i>	Yes, Treatment <i>.004</i>	No <i>.834</i>

Sound Identification Results

The treatment group had an advantage in regards to identifying the sounds associated with particular letters at the post-test on the District Assessment ($p < .001$ for both the uppercase and lowercase sounds). They also exhibited significant differential growth from the midpoint to the post-test ($p < .001$ for both uppercase and lowercase sounds) and from the pre-test to the post-test ($p \leq .001$ for both uppercase and lowercase sounds; see Table 3 below)

WERP-1 treatment students scored significantly higher than comparison students in recognizing letter sounds in post-tests. For Sounds Uppercase they had a mean gain from pre to

post of 17.34 vs. 11.09 ($p < .001$) and Sounds Lowercase they had a mean gain of 16.59 vs. 10.86 ($p < .001$). The results indicate that the use of WERP-1 for the prescribed time period of 12-minute sessions five days a week significantly increased these pre-kindergarten students' abilities to identify the sounds associated with letters. WERP-1 appears to provide an excellent medium promoting phonological awareness as easily and quickly as possible.

Table 3

Overview of District Assessment Sound Identification Results (*p*-values are italicized).

	Did the groups differ at any point in time? If so, which group did best?			Was there differential growth? If so, which group "grew" more?		
	<i>Pre</i>	<i>Mid</i>	<i>Post</i>	<i>Pre to Post</i>	<i>Pre to Mid</i>	<i>Mid to Post</i>
Sounds Uppercase	No <i>.119</i>	No <i>.089</i>	Yes, Treatment <i><.001</i>	Yes, Treatment <i><.001</i>	No <i>.135</i>	Yes, Treatment <i><.001</i>
Sounds Lowercase	Yes, Treatment <i>.028</i>	No <i>.068</i>	Yes, Treatment <i><.001</i>	Yes, Treatment <i>.001</i>	No <i>.152</i>	Yes, Treatment <i><.001</i>

Other Results based on District Assessment

The ability to copy a symbol is an emergent skill to writing. The District Assessment measured this skill at the pre-test and post-test, but not at the mid-point. It appears that while the comparison group had an advantage at the pre-test on this item, the treatment group experienced more growth over time than did the comparison group. The groups were not found to differ on their ability to write their names or identify colors (see Table 4 below).

Table 4

Overview of Other District Assessment Results (*p*-values are italicized).

	Did the groups differ at any point in time?			Was there differential growth? If so, which group “grew” more?		
	If so, which group did best?					
	<i>Pre</i>	<i>Mid</i>	<i>Post</i>	<i>Pre to Post</i>	<i>Pre to Mid</i>	<i>Mid to Post</i>
Copy Symbol	Yes, Comparison <i>.011</i>	Not available	No <i>.422</i>	Yes, Treatment <i>.024</i>	Not available	Not available
Writes Name	No <i>.843</i>	No <i>.716</i>	No <i>.742</i>	No <i>.990</i>	No <i>.896</i>	No <i>.934</i>
Colors	No <i>.568</i>	Not available	No <i>.179</i>	No <i>.977</i>	Not available	Not available

The results suggest that use of WERP-1 for the prescribed time period of 12-minute sessions five days a week significantly increased these pre-kindergarten students' abilities to identify the sounds associated with letters. Phonological awareness is necessary for success in both the ability to read and spell words. Therefore, teachers, principals, and parents hope to assist children in developing this skill as easily and quickly as possible. Evidence indicates that WERP-1 provides a medium in which to achieve this imperative skill.

2. What are teachers' and site principals' attitudes toward using the Waterford Early Reading Program?

The interview data corpus included individuals represented from all three of the treatment sites that implemented WERP-1. An interview was conducted with these three treatment teachers and their site principals, in order to attain a more detailed understanding of their attitudes and perceptions about using WERP-1 with students.

Teachers' overall views of WERP-1. Teachers reported that WERP-1 was an effective supplemental curriculum that taught basic skills, reinforced teachers' lessons and was a fun and engaging way for students to learn. It appeared to address different learning styles, allowed students to learn at their own pace and ability level, and was able to be accomplished with some degree of student independence.

All three teachers said that if they had the option to use WERP-1 with pre-kindergarten students in the future they would voluntarily use it. These teachers also commented on the fact that they thought that WERP-1 covered the basics, and two of the teachers made direct reference

to the fact that WERP-1 reinforced the skills they were teaching in the classroom. One teacher said, “Yes, it reinforces the content of the curriculum...” Another teacher said, “I would choose to use it because it gives the kids a different program to help.”

Principals’ overall views of WERP-1. All three principals mentioned that they believed that WERP-1 would give their pre-kindergarten students a distinct academic advantage in kindergarten and were pleased about how the students’ exposure to it may increase their performance with basic skills. One principal said, “Next year they are going to have kindergarten with all those basics, they don’t have to worry about that, they are coming in with that.” Principals were also excited to compare the performance of the previous year’s kindergarten students to the results for the treatment students who attended preschool (hence receiving WERP-1 instruction). As one principal said, “It will be a really neat experience to...compare [student performance from] this year to next year at the same time. And I am sure there will be something significant... This is exciting!”

Challenges of WERP-1 for EL students. In addition to liking many attributes of the WERP-1 software and the students’ performance, teachers and administrators offered recommendations as to how the program could be improved to assist EL students. Overall, there were nine mentions to EL students in the interview data corpus, with three people observing that ELs were frequently scared of the computers and resistant to working on them due to language difficulties. Those expressing concerns suggested offering directions in various primary languages and/or providing for an adult to work with students at the computer.

Additional benefit of learning technology. One teacher and one principal mentioned their excitement in regards to WERP-1 not only teaching early reading skills, but also teaching

children to use technology, which will benefit them in the future. This was best stated by a teacher who commented, “Yes, it [WERP-1] is a good accompaniment to the curriculum, but more important than that, it teaches them computer skills. I think that to me that was more effective, more, for life long [learning]...they’ll go to kindergarten and they’ll know how to use the computer. They’re going to get their letter sounds and that in the classroom...” A principal also commented on the fact that, “Technology is our future...I just like the idea that preschoolers are having access and starting [with technology] that early.” One of the teachers mentioned that parents are also excited that students have the opportunity to go on the computer. She said one of the parents asked with excitement, “Oh, my child gets to go on the computer?” So it appears, that for some participants and parents, the technology skills obtained from using WERP-1 were also seen as extremely beneficial. Results indicate that WERP-1 treatment students, with at least 1000 minutes of use, recognize uppercase and lowercase letters more quickly (a statistically significant advantage at the midpoint) than the students in the comparison group, and score significantly higher than comparison students in recognizing letter sounds in post-tests as well as demonstrate more growth (from pre to post) in sound identification.

One obvious question may be, “Do the results presented in this study justify the expenditure on WERP-1 by early childhood programs?” If the results do not warrant the expense, are there aspects of WERP-1 that could be simulated in the curriculum without the actual use of the ILS (e.g. if graphics were helpful, could additional use of pictures improve student achievement)? Furthermore, does the exposure to literacy through the personalized instruction of the ILS compensate for a literacy sparse environment at home or would instructional time used on computers be better spent on other classroom activities? And if

according to assessment data students' attainment of literacy skills is not statistically significant, is there still sufficient value to be gleaned from WERP-1, or other ILSs, by students using technology daily?

All three treatment teachers said they would voluntarily use WERP-1 in the future with pre-kindergarten students. Some of the teachers expressed their desire to learn more about modifying the order of WERP-1 lessons to match their particular curriculum, and voiced their preference that EL students receive WERP-1 instruction in their home language. If these modifications were realized would that contribute to additional statistically significant results from WERP-1 usage? Also, it would be interesting future research to investigate what assessment results teachers and administrators consider as indicators that WERP-1 or other ILS software is worth the expense and curricular time.

The importance of developing emergent literacy skills is paramount to future academic success (Kamil, Mosenthal, Pearson, & Barr, 2000; Snow, Burns, & Griffin, 1998). While computers and ILSs cannot replace the valuable interactions between students and skilled adults, the individualized sequence of lessons, positive gains in phonological awareness (and other benefits) reported in a number of studies (Hecht & Close, 2002; Tracey & Young, 2007), and exposure to technology may positively contribute to students' emergent literacy development. Each early childhood education program will need to assess whether an ILS fits their objectives and if so, do the results and experiences provided warrant the expense.

References

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

Becker, H.J. (1992). A model for improving the performance of integrated learning systems. *Educational Technology*, 32, 6-15.

Clay, M.M. (1967). The reading behavior of 5-year old children: A research report. *New Zealand Journal of Educational Studies*. 2, 11-13.

Cuban, L. (2001). *Oversold and underused: Computers in the classroom*. Cambridge, MA: Harvard University Press.

Dooley, C (1993). The challenge: Meeting the needs of gifted readers. *The Reading Teacher*, 46, 12-17.

Dyrli, O, E. (2007) *District buying power*, Retrieved: June 2, 2009 from District Administration.<http://www.districtadministration.com/viewarticle.aspx?articleid=1263&p=2#0>

Elliott, E.M., & Olliff, C.B. (2008). Developmentally appropriate emergent literacy activities for young children: adapting the early literacy and learning model. *Early Childhood Education Journal*. New York: Knopf. 35(6), 551-556.

Hecht, S.A., & Close, L. (2002). Emergent literacy skills and training time uniquely predict variability in responses to phonemic awareness training in disadvantaged kindergarteners. *Journal of Experimental Child Psychology*, 82, 93-115.

Honig, A. (2001). *Teaching our children to read*. Thousand Oaks, CA: Corwin Press.

Houghton Mifflin, *Pre-k "Where bright futures begin!"* Retrieved August 2006, from

<http://www.eduplace.com/marketing/prek/>.

Kamil, M.L., Mosenthal, P.B., Pearson, P.D., & Barr, R. (Eds.). (2000). *Handbook of reading research* (Vol. 3). Mahwah, NJ: Erlbaum.

Kamil, M.L., & Lane, D.M. (1998). Researching the relationship between technology and literacy: An agenda for the 21st century. In D.R. Reinking, L.D. Labbo, M.C. McKenna, & R. Kieffer (Eds.), *Literacy for the 21st century: Technological transformations in a post-typographic world* (pp. 323-342). Mahwah, NJ: Erlbaum.

Maddux, C.D., & Willis, J.W. (1992). Integrated learning systems and their alternatives: Problems and cautions. *Educational Technology*, 32, 51-57.

Paterson, W.A., Henry, J.J., O'Quin, K., Ceprano, M.A., & Blue, E.V. (2003). Investigating the effectiveness of an integrated learning system on early emergent readers. *Reading Research Quarterly*, 38, 172-207.

Shaywitz, S. (2004). *Overcoming dyslexia: A new and complete science-based program*. *Reading Research*. Volume III. Mahwah, NJ: Lawrence Erlbaum Associates.

Sherry, M. (1990). Implementing an integrated instructional system: Critical issues. *Phi Delta Kappan*, 72, 118-120.

Snow, C. E., Burns, S., & Griffin, P. (1998). *Preventing reading difficulties in young children*. Washington, DC: National Academy Press.

Strickland, D.S., & Shanahan, T. (2004). Laying the groundwork for literacy. *Educational Leadership*, 61(6), 74-77.

Sulzby, E. (1985). Children's emergent reading of favourite storybooks: A developmental study.

Reading Research Quarterly, 20, 458-481.

Tracey, D.H., & Young, J.W. (2007). Technology and early literacy: The impact of an integrated

learning system on high-risk kindergarteners' achievement. *Reading Psychology*, 28:

443-467.

Wood, D., Bruner, J.S., & Ross, G. (1976). The role of tutoring in problem solving. *Journal of*

Child Psychology and Psychiatry, 17, 89-100.