

12-1-1997

## Children, Storybooks and Computers

Susan Talley  
*University of Toledo*

David F. Lancy  
*Utah State University*

Thomas R. Lee  
*Utah State University*

Follow this and additional works at: [https://scholarworks.wmich.edu/reading\\_horizons](https://scholarworks.wmich.edu/reading_horizons)



Part of the Education Commons

---

### Recommended Citation

Talley, S., Lancy, D. F., & Lee, T. R. (1997). Children, Storybooks and Computers. *Reading Horizons: A Journal of Literacy and Language Arts*, 38 (2). Retrieved from [https://scholarworks.wmich.edu/reading\\_horizons/vol38/iss2/4](https://scholarworks.wmich.edu/reading_horizons/vol38/iss2/4)

This Article is brought to you for free and open access by the Special Education and Literacy Studies at ScholarWorks at WMU. It has been accepted for inclusion in Reading Horizons: A Journal of Literacy and Language Arts by an authorized editor of ScholarWorks at WMU. For more information, please contact [wmu-scholarworks@wmich.edu](mailto:wmu-scholarworks@wmich.edu).



## Children, Storybooks and Computers

**Susan Talley**  
**David F. Lancy**  
**Thomas R. Lee**

*This study was designed to test the use of CD-ROM storybook programs' effects on preschool aged children's emergent literacy. 73 four-year-old children, divided into three study groups (experimental, control and well-read-to control) all enrolled in a Head Start program were given the opportunity to use CD-ROM storybooks during their free-choice time for approximately eight weeks. At the end of the trial period, the experimental group was compared with the control group and with their well-read-to peers. Results indicated that CD-ROM storybook programs may have a significant effect on the emergent reading skills of those children who are not as well-read-to prior to entering school.*

"C.J." is, quite literally, bouncing off the walls, as we lead our six charges from their regular classroom to the multi-purpose room where three computer stations have been set up. Each trip we try a different tactic (playing "train" where children are coupled together by a yellow rope) or exhortation ("We use walking feet.") — to no avail. In the carrel with his partner Matt, C.J. doesn't take a seat; he barely touches the edge of the chair. He grabs the mouse and begins frantically pushing the buttons. One of us fits C.J. with headphones, and Matt gently places his hand under C.J.'s and uses the mouse to start the story. As the story begins, C.J.'s attention is riveted, his death grip on the mouse relaxes; he slides on his seat. Then, as the story nears its conclusion, C.J.'s spring rewinds, and he struggles to keep it coiled until Matt rides the mouse onto the pages of the next story which again, mesmerizes his partner.

C.J.'s experience was only the most interesting of several unexpected effects that emerged from our 6 month-long trial of CD-ROM storybook software (IBM's Stories and More). CD-ROM storybooks have proliferated in the last few years and we were interested in discovering whether their use in a Head Start setting might serve to compensate for some children's low level of prior experience with storybooks. First, we define the scope of the problem, then describe the setting and our approach and, finally, offer encouraging conclusions.

### **Background to This Study**

Recent studies indicate that the child's first reading experiences in the home are critical to his/her eventual success in school. The research literature yields the conclusion that children who learn to read early or easily are read to at home (Durkin, 1966; and Teale, 1978). Bus, van Ijzendoorn and Pellegrini (1995) analyzed 33 studies in this general area and concluded that: "Our data ... particularly support the assumption that parent-preschooler reading is a necessary preparation for beginning reading instruction at school" (p. 17).

However, a survey conducted in 1993 (National Educational Goals Panel, 1994) found that fewer than 2/3 of preschool-age children are read to at home. This figure must be set against a decade of media bombardment and a plethora of new programs (e.g., "Running Start," Lancy 1994a) promoting family reading with young children.

In recent years, preschool and primary teachers have embraced the philosophy of reading aloud to their students. Evidence of positive effects is growing (Box and Aldridge, 1993); however, many questions remain. Story reading in a group setting may not be completely effective in replicating the effects achieved in one-on-one reading as practiced at home (Morrow, O'Connor and Smith, 1990). Teachers seem to employ a range of strategies in reading aloud to their classes which have a different impact on emergent literacy (Dickinson and Smith, 1994). Preschool "Children ... vary in their tendency to 'pick up' story language from read aloud sessions, a difference ... related to how familiar children are with book

reading in their homes" (Elster, 1994). Lastly, literacy activities, including read aloud sessions, were largely absent until recently, in the very setting (Head Start classes) where they were most needed (Dickinson, 1989).

We believe that, as valuable as group reading sessions are, they may not close the gap between children who are "well-read-to" (up to 1000 hours of at-home, before attending school, storybook reading, according to Adams, 1990) and those whose exposure to stories and print have been more limited. It is our premise that personal computers may offer a partial solution. Despite an initially negative reaction by early childhood educators, computers in preschool have recently earned a cautious endorsement (Waxler, 1994). With respect to reading and literacy in particular, Strickland, Feeley and Wepener (1987) suggest that the use of computers in reading instruction is often a powerful motivating force in and of itself. Until recently, however, the only programs available matched the "readiness" as opposed to the "whole language" or "emergent literacy" reading instruction paradigm (Lancy, 1994b).

### **CD-ROM Storybooks**

The invention of CD-ROM storybooks (Parham, 1993) has changed all that. The basic genre is a classic picture book with accurately reproduced illustrations and a corresponding soundtrack. A mouse-based interface permits children to "turn the pages" and select titles from a menu. Furthermore, there are features of the CD-ROM storybook experience suggesting more of an adult-child reading session as opposed to the teacher-led group session. There is greater interaction: the child controls the pace at which pages are turned; s/he selects which book to read and/or re-read; s/he may do a word by word or line-by line reading; and there are "help" buttons.

It is important to note that, while there is a growing number of CD-ROM storybooks, we have chosen to use IBM's *Stories and More*. Unlike many of the popular storybooks that are widely available, *Stories and More* was designed for classroom use and provides a variety of stories all on one disk. There are several features that provide the teacher with a

great deal of flexibility. First, the teacher determines whether the program will allow the child to either pick a story from a menu randomly or to have the stories read sequentially. Second, the teacher can assign a specific story the child will read at his/her next visit to the computer. Finally, the computer keeps track of how much time each child has spent on a particular story or activity.

Many CD-ROM storybooks provide activities for the child to do on each page of the storybook. These entertaining features may detract from the actual story, causing the child to lose track of the plot and the sequence of story events. *Stories and More* provides activities for the child to participate in before the story begins. For example, in the classic tale *The Three Billy Goats Gruff*, children may create their own version of the troll. They have a choice of three heads, three bodies, and three feet that they may mix and match. Then, the next screen allows the children to create a sequence of events. First, the children move the goats (starting with the smallest Billy goat) onto the screen before it actually begins. Then they may build a bridge and put water under the bridge. The story itself is not subject to manipulation. This feature provides an opportunity for the child to think about the story before they actually read it ... much like an initial question, answering, and predicting session that some parents or teachers would use prior to reading a book with their children.

The software may be set so the child hears an actor reading the story or it may be set for the child to read independently, with the option of allowing the child to highlight difficult words for the computer to read individually. Following the story, children may try the "Thinking About" and "Going Beyond," activities; however, we found these too advanced for 4 year-old children and deleted that option from the program.

Intuitively, *Stories and More* seemed appropriate for the 4 year-olds in Head Start, but the program was originally developed for somewhat older children. For this reason, IBM Eduquest could offer us no anecdotal evidence that it had been tried successfully with preschoolers and we found no published literature to guide us — aside from a very brief anecdotal

report on another CD-ROM storybook program (Miller, Blackstock and Miller, 1994). The proximal goal was to determine whether the logistical obstacles could be resolved so that a CD-ROM storybook "center" would mesh with existing centers in the classroom. Our more ambitious and distal goal was to obtain at least a preliminary indication of whether such a program might have a positive impact on children's emergent literacy. In order to adapt the program to this age group, we used developmentally appropriate practice (DAP) to guide our decisions and carefully tried out the program in the Bear River Head Start in Logan, Utah. These practices will be discussed in more detail by describing the setting and methods of the study.

### **Methods**

Setting and Population. Head Start is a nationwide program aimed at providing school readiness and health and welfare benefits to four-year-old children from low income families. This participating Head Start is located in Northern Utah near the State University. This provides an unusual setting in that the client population is predominantly of the "Mormon" faith which places a premium on family literacy and many of the participants are children of students at the university, although there were also children of migrant farm workers and of working class families that attended the program as well.

There were eight classes of children; four classes in the morning and four in the afternoon. A total of 73 children participated in the entire study (85% of the total Head Start Center population 36 girls, and 37 boys). The remaining 15% were lost due to attrition. Only one parent refused to let her child participate in the study. All of the children were four years old by the start of school in September. The children were predominantly of European-American descent, although there were a few families who had recently immigrated from Mexico and were learning English as a second language.

Three computers were given by Eduquest to the Head Start program and placed in the Family Literacy Center rather than the classrooms for

three reasons: 1) to ensure a random sample was drawn from the entire Head Start population rather than limited by classroom; 2) to limit contamination of the study by controlling access to the CD-ROM storybooks; and 3) to ensure that all the children had the opportunity to use the computers.

**Measures.** We used three measures to assess the child's emerging literacy level: 1) *Print Awareness Test*; 2) *Concepts About Print*; and 3) *Picnic*. The *Print Awareness Test* (Huba & Kontos, 1985) was designed to identify the child's level of print awareness in the everyday environment. This test was developed specifically for this age group and was ideally suited to preschoolers because of its relatively short time to administer and minimal verbal response. The second measure, *Concepts About Print* (Clay, 1979) assesses children's familiarity with print conventions. The instrument is a replica of a typical picture book but with errors, such as text being printed upside down on a particular page. Finally, *Picnic*, (McCully, 1984) is a popular wordless picture book which has been developed into a clever test by Lynne Putnam (1994) to measure a child's understanding of story structure and sequence. In this measure, the child is asked to "read" the book and a protocol for scoring these readings reflects the child's emergent literacy development.

In each of the measures, children received a point if they got the item correct. For example, in the *Picnic* measure, if the child recognizes that the mouse family is leaving one little mouse behind and the family doesn't know it, the child receives one point. If the child is able to point to the correct picture in the *Print Awareness Test*, then the child also receives one point. This scoring method allowed us to aggregate the scores on all three measures making dichotomous variables into continuous variables.

**Procedure.** The project was divided into three phases. Phase one began at the start of the school year when the principal investigator introduced the project to families at the annual orientation meeting. We described the project to parents, asked them to sign a letter of informed consent, and administered a parent questionnaire designed to assess the current

amount of reading each child has already received in the home. All children who had been given permission to participate in the project were then administered the series of reading assessments by asking children to "come and play a game" with the project staff. We administered each assessment to the children either in one session or over a series of sessions, depending on the child's interest and attentiveness to the "games." After initial measurements were completed, children's scores were aggregated to determine the top third of the children who were assigned to the well-read-to group (N=13). The remaining two-thirds of the children were randomly assigned into either an experimental (N=28) or control (N=32) group.

Phase two involved taking only the experimental group to the computers (approximately six at a time — two per computer) for a twenty minute session using the CD-ROM storybook program. During the children's free-choice time, parent and grand-parent volunteers and graduate students from the Department of Family and Human Development the university took the experimental group from their classrooms to the computer centers where the children were allowed to use the computers for as long as the children wanted to remain (according to DAP). Volunteers kept field notes at each of the stations documenting what children did at the computer and providing anecdotes of the children's experiences each time they participated. At the end of phase two, all children received the same measures as a posttest.

During phase three, the remaining children (well-read-to and control group) were taken to the center and were given the same amount of time at the computers as the experimental group. At this time, we analyzed the data and gave the parents a brief description of the results of the study and a summary of the child's progress on the computers at the end of the year.

Analysis. Reviewing the field notes of the children at the computer, we found that the children required very little assistance from the volunteer once they learned the basics of using the menu and the mouse. Some of them already had some experience in computer use; however, there were other children who had a difficult time trying to master the hand-eye

coordination. By using the mouse and watching the screen, many of the children improved their fine motor skills. For example, the field notes indicated that Bethany had a difficult time trying to place the cursor where she wanted it to be and then keeping it there while trying to push the mouse button at the same time. Over time, she resolved this problem by using two hands — one position the mouse, the other to click on the mouse button.

Children spend approximately 12-15 minutes on the computer actively engaged in each learning session. The total average time from "Please enter your name" to "Stop for today," was 20-35 minutes. Each child visited the computer an average of 12.4 times with a range between 6 and 20. The total time the children logged on the computer ranged between two and six hours. Children read an average of 45 stories with a range from 22 to 83. Of their own volition, children were read several of the stories more than once.

We designed the parent-questionnaire so that a higher score indicated greater exposure to print (e.g., number of books in the home, how many people read to the child, etc.). Because our population was not a "typical" Head Start population, questionnaire results (directed a storybook reading in the home) more closely resembled the mainstream. That is, the mainstream had been read to often and from an early age. Despite this ceiling effect, those children who had received the highest aggregate score on the questionnaire, also made the highest aggregate score on our three measures of emergent literacy, forming our "well-read-to" group.

Mean scores at pretest indicated higher scores on all three measures for the well-read-to-group. To test significance, we used the Analysis of Variance (ANOVA) procedure at time 1 (pretest) to determine if there were any significant differences between the three test groups and our dependent measures. The main effects were significant for the *Print Awareness Test* and the *Concept About Print* test, but we didn't know if one group was significantly different from the others. The Least Significant Differences (LSD) post hoc test for multiple comparisons indicated that

the experimental and control groups were not significantly different from each other, but they were significantly different from the "well-read-to" group as we expected (see subscripts "a" and "b" on table 1). Even though the main effects for the *Picnic* measure did not show significance using the ANOVA ( $p=.07$ ), we did find a significant difference between the well-read-to group and the two control groups using the LSD procedure.

Table 1  
ANOVA on pre-test mean scores by group.

Assessment	Experimental Group		Control Group		Well-Read Control Group		P
	n = 28 mean	sd	n = 33 mean	sd	n = 13 mean	sd	
Pretest							
Print Awareness Test	6.714 <sub>a</sub>	3.95	5.06 <sub>a</sub>	3.97	11.15 <sub>b</sub>	4.95	.00
Concepts About Print	3.33 <sub>a</sub>	1.59	4.00 <sub>a</sub>	2.61	7.00 <sub>b</sub>	3.63	.00
Picnic	6.75 <sub>a</sub>	3.62	7.63 <sub>a</sub>	4.53	10.1 <sub>b</sub>	5.04	.07

Means that share a subscript are not significantly different at the .05 level using a LSD multiple range test.

By posttest, the main effects for both the Print Awareness and Concepts About Print test still showed significance using the ANOVA ( $p=.07$ ), we did find a significant difference between the well-read-to group and the two control groups using the LSD procedure.

By posttest, the main effects for both the *Print Awareness* and *Concepts About Print* tests still showed significance using the ANOVA procedure, but the LSD procedure indicated that the experimental group and the control group were no longer similar. In fact, the experimental group and the well-read-to groups were both significantly different from the control group (note the change in subscripts "a" and "b" on table 2). Once again, the *Picnic* scores did not show significance using the ANOVA procedure, but there was a significant difference using the LSD procedure.

Table 2  
ANOVA on post-test mean scores by group.

Assessment	Experimental Group		Control Group		Well-Read Control Group		P
	n = 28		n = 33		n = 13		
	mean	sd	mean	sd	mean	sd	
Posttest							
Print Awareness Test	7.21 <sub>a</sub>	4.06	4.90 <sub>b</sub>	3.74	7.71 <sub>a</sub>	3.20	.02
Concepts About Print	4.06 <sub>a</sub>	6.69	5.18 <sub>b</sub>	3.18	8.81 <sub>c</sub>	4.48	.00
Picnic	9.21 <sub>a</sub>	4.49	8.21 <sub>b</sub>	3.81	10.92 <sub>a</sub>	3.71	.11

Means that share a subscript are not significantly different at the .05 level using an LSD multiple range test.

To examine if there were significant differences by group pretest (time 1) to posttest (time 2), we used the paired t-test (see table 3). The experimental group's scores on the *Concepts About Print* measure showed the most significant changes over time even though mean scores increased on all three measures. The fact that there were significant gains across all three groups on the *Concepts About Print* measure suggests that these concepts are some of the critical elements included in the Head Start curriculum or that the improvement in scores on this measure is due to maturation (Chill, Jacobs, and Baldwin, 1990).

The mean scores on the *Concepts About Print* measure was the most significant in the experimental group more than in the other two groups indicating that something else was affecting these scores besides the regular Head Start curriculum or maturation effects. *Picnic* also indicated significant changes from pretest to posttest ( $p < .05$ ) but only for the experimental group. There was no significant gain in scores over time on the *Print Awareness Test*, nor did we expect there to be. The *Print Awareness Test* measures awareness of environmental print rather than

knowledge of literacy text. Furthermore, it is appropriate that the well-read-to group's scores were higher than the other two groups and further substantiates the literacy rich environment in their home. It should be noted that mean scores for the well-read-to group were still higher than the control or experimental groups on all three measures.

Table 3

Paired t-test scores: Pretest (time 1) compared to Posttest (time 2).

Assessment	Experimental Group n=28					Control Group n=32					Well-Read-To Control Group n=13				
	time 1		time 2			time 1		time 2			time 1		time 2		
	x	sd	x	sd	t	x	sd	x	sd	t	x	sd	x	sd	t
Print Awareness Test	6.7	4.0	7.2	4.1	-.7	5.1	4.0	4.1	3.7	.2	11.2	4.9	8.1	3.0	3.1*
Concepts About Print	3.3	1.6	6.9	3.4	-5.7**	3.7	2.6	5.2	3.2	-3.5**	7.0	3.6	9.2	4.3	-2.5*
Picnic	6.7	3.6	9.2	4.4	-2.9*	7.6	4.5	8.2	3.8	-.8	10.3	5.0	11.2	3.6	-.8

- \* indicates statistical significance at the .05 level
- \*\* indicates statistical significance at the .005 level
- \*\*\* indicates statistical significance at the .0005 level

## Discussion

As the anecdote that began this article suggests, virtually every child in this Head Start was able to adjust comfortably to the program. During the year following our trial, the computers have been integrated into classrooms and have become just another "center." The computer stations now require much less direct adult supervision than we found necessary when using the multi-purpose room. We established that a range of Head Start students are willing and able to interact with a program that reads classic storybooks to them. The benefit to those children in the control group seems clear.

It would appear that CD-ROM storybooks may have a role to play in providing "at-risk" children with an immersion in the kind of "storybook culture" that other children experience from birth. Many preschool programs that serve youth at-risk do have the means to purchase the necessary computer hardware and software, at least in the U.S. These programs are largely foolproof, requiring no computer expertise from the teacher. The

typical preschool instructional arrangement using the various learning centers lends itself to the integration of one or two computers as centers. Children are almost universally attracted to computers and to storybooks so getting them to use the CD-ROM storybooks should never be an issue. Because of the interactive, multimedia nature of this "genre," children with disabilities may be aided by CD-ROM storybooks, as opposed to more traditional media.

Our proximal goal was to determine the feasibility of using a CD-ROM Storybook in Head Start. This we did. Things ran smoothly and continue to do so after the study's completion. Our distal goal was to probe the usefulness of CD-ROM storybooks in closing the "readiness" gap between preschoolers with lots of prior exposure to storybooks and those with much less experience. Our results are promising but limited. Our population was somewhat atypical (offspring of middle class, but temporarily low-income students attending the local university). A more typical Head Start population might have yielded more dramatic results. The scale of the study was also modest in terms of sample size and duration. A larger scale replication is called for. However, measures of emergent literacy aren't very robust, so an ideal study would follow students at least into the third grade when measures of "real" reading could be employed.

A note of caution should be added. Using CD-ROM storybooks in a preschool setting does seem to have a very positive effect, but it does not replace a literacy rich environment in the home. Given the importance of early reading experiences, we believe that providing computers and CD-ROM storybooks in the preschool environment is one way to provide more exposure to books and print for those children who have not had that opportunity at home.

### References

- Adams, M.J. (1990). *Beginning to read: Thinking and learning about print*. Cambridge MA: MIT Press.
- Box, J.A., & Aldridge, J. (1993). Shared reading experiences and Head Start children's concepts about print and story structure. *Perceptual and Motor Skills*, 77, 929-930.

- Bus, A.G., van Ijzendoorn, M.H., & Pellegrini, A.D. (1995). Joint book reading makes for success in learning to read: A meta-analysis on intergenerational transmissions of literacy. *Review of Educational Research*, 65, 1-21.
- Clay, M.M. (1979). *The early detection of reading difficulties* (3rd ed.). Auckland New Zealand: Heinemann.
- Dickinson, D.K. (1989). Effects of a shared reading program in one Head Start language and literacy environment. In J. Allen & J. Mason, (Eds.), *Risk makers, risk takers, risk breakers* (p. 121-152). Portsmouth NH: Heinemann.
- Dickinson, D.K., & Smith, M.W. (1994). Long-term effects of preschool teacher's book readings on low-income children's vocabulary and story comprehension. *Reading Research Quarterly*, 29, 105-122.
- Durkin, D. (1966). *Reading and the kindergarten. An annotated bibliography*. Newark DE: International Reading Association.
- Elster, C.A. (1994). "I guess they do listen." Young children's emergent readings after adult read-alouds. *Young Children*, 49, 27-31.
- Huba, M.E., & Kontos, S. (1985). Measuring print awareness in young children. *Journal of Educational Research*, 78, 272-279.
- Lancy, D.F. (1994a). Too little, too late: A case study of running start. In D.F. Lancy (Ed.), *Children's emergent literacy: From research to practice* (pp. 157-168). Westport CT: Praeger.
- Lancy, D.F. (1994b). The conditions that support emergent literacy. In D.F. Lancy (Ed.), *Children's emergent literacy: From research to practice* (pp. 1-20). Westport CT: Praeger.
- McCully, E.A. (1984). *Picnic*. NY: Harper & Row.
- Miller, L., Blackstock, J., & Miller, R. (1994). An exploratory study into the use of CD-ROM storybooks. *Computer Education*, 22, 187-204.
- Morrow, L.M., O'Connor, E.M., & Smith, J.K. (1990). Effects of a story reading program on the literacy development of at risk kindergarten children. *Journal of Reading Behavior*, 22, 255-276.
- National Educational Goals Panel. (1994). *The national goals report*. Washington D.C.: US Government Printing.
- Parham, C. (1993). CD-ROM storybooks. *Technology & Learning*, 13, 34-44.
- Strickland, D.S., Feeley, J.T., & Wepner, S.B. (1987). *Using computers in the teaching of reading*. NY: Teachers College Press.
- Teale, W.H. (1978). Positive environments for learning to read: What studies of early readers tell us. *Language Arts*, 55, 922-932.
- Waxler, T. (1994). Computers in the Head Start classroom ... an update. *Head Start Bulletin*, 42, 10.

*Susan Talley is a faculty member in the Department of Educational Psychology, Research and Social Foundations at the University of Toledo, in Toledo Ohio. David F. Lancy is a faculty member in the Department of Sociology, Social Work and Anthropology and Thomas R. Lee is a faculty member in the Department of Family and Human Development at Utah State University, in Logan Utah.*