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ABSTRACT

This paper describes a practicum designed to use CD-ROM books as a supplement to the basal reading program to improve reading comprehension in second grade students from a predominantly rural area in Delaware. A non-equivalent control group design was used involving a 20-member treatment and a 16-member control group. Pre- and postreading comprehension tests were administered. During the treatment, students read and investigated the stories on the computer. Each group had a minimum of three 15-minute sessions each week. During this time, the children read the stories and investigated the vocabulary at the computer. Gains in reading achievement were evaluated using simple analysis of covariance. While results showed no statistical significance, comments from students and teachers indicated that the children were highly motivated to read the books on CD-ROM. (Eighteen references, information about the books on CD-ROM, a story log form, the analysis of covariance, and numerous samples of children's letters are attached.) (Author/RS)

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The Use of CD-Rom Based Books to Improve Reading Comprehension in Second Grade Students

By

* Dorothy G. Standish

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*Coordinator of Technology
Lake Forest School District
(302) 284-3020

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Abstract

Author: Dorothy G. Standish Cluster: Georgetown
Date: July 1992 Practicum: Instruction

TITLE: The Use of CD-Rom Based Books to Improve Reading Comprehension in Second Grade Students

ABSTRACT: This report describes a program fo. the use of CD-Rom books as a supplement to the basal reading program to improve reading comprehension in second grade students. Technology, primarily computers, is being integrated into classroom instructional environment. The strength of technology lies in its use. CD-Rom books, such as Discis books, are a type of hypermedia which allows the student to explore multiple aspects of the book.

A Non-equivalent Control Group Design was used involving a treatment and a control group. Pre and post reading comprehension test were administered. During the treatment, students read and investigated the stories on the computer. Each group had a minimum of three 15 minutes sessions each week. During this time, the children read the stories and investigated the vocabulary at the computer. Gains in reading achievement were evaluated using simple analysis of covariance. Validity issues included the use of two different teachers and children not randomiy assigned.

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Chapter 1

PROBLEM STATEMENT AND CONTEXT

General Statement of the Problem

Technology has been promoted as a powerful instructional tool. The real strength of this tool is the method in which teachers use it. At Lake Forest East Elementary, there is one computer in each classroom and two in the library. Most of these computers are being used by students for remediation, primarily through the use of drill and practice software.

Description of the Problem

Teaching children to read is one of the fundamental goals of the primary grades. Presently reading is taught in the Lake Forest School District through the use of a basal reader with instruction guided by classroom teachers and Chapter 1 reading para-professionals. Students are taught through a sequential series of lessons. Children are grouped for reading instruction and progress at the pace dictated by the teacher and the basal.

Children learn at different rates. Technology can free the student to learn at an individual rate by allowing the student to explore and learn at a unique pace.

This study investigates an alternative use of technology to enable the students to learn at an individual rate. The students investigate those portions of CD-ROM based books that meet individual needs at an individual pace.

Description of the School and Community

The Lake Forest School District includes the small towns of Bowers Beach, Canterbury, Felton, Frederica, Harrington, and Viola and stretches across Delaware from the Maryland state line to the Delaware Bay. The land area is predominantly used for agriculture. District residents who are not involved with farming may find employment in several small industries within the district, or in the state capital, Dover, located just a few miles to the north.

Lake Forest East Elementary School has approximately five hundred students in grades kindergarten through six. It is the smallest of three elementary schools in the Lake Forest School District. The school is located in the town of Frederica, Delaware between Milford and Dover.

The staff of Lake Forest East is headed by the principal. Support staff includes a counselor and full time nurse. The speech therapist and psychologist are shared with other schools. There is one full time and one part time secretary. Teaching staff includes 22 regular classroom teachers, a basic skills teacher, three special education teachers, an art teacher, a music teacher, a physical education teacher, and a gifted and talented teacher who is also shared with another school. The library is under the direction of a paraprofessional. There are also seven paraprofessionals who support the Chapter I program in the primary grades. Playground Monitors, Food Service Workers, and Custodians are also part of the school community.

Description of the Student Population

The students at Lake Forest East come from varied backgrounds including children of watermen, farmers, industrial workers, and professionals. Approximately 24 percent of the children qualify for federal assistance and participate in the free lunch program. Another eight percent receive reduced price lunch under federal guidelines. This totals approximately one-third of the school population. In the second grade, 16 percent receive free lunch

while nine percent receive reduced price lunch. (Scott, 1992) The September 30, 1991 student enrollment indicates that the school population is 19% Black, 1% Asian, 3% Hispanic, and 77% White. In the second grade, there are 22% Black, 2% Hispanic, 76% White, and no Asians. (Gilbert, 1992)

Most of the students are bussed to the school from the surrounding area which includes the village of Bowers Beach, residential developments, and farms. However, four per cent of the school population walk to school from homes in Frederica. (Daisey, 1992) According to the United States Census of Population 1980 records, in Frederica the median family income is $22,811 which falls significantly below the median of $44,585 for the state of Delaware. (Bureau of Census, 1980) The Frederica median family falls below the $25,250 income level that district guidelines denote as economically disadvantaged. The home values in Frederica range from $31,000 to $63,000 with a median home value of $48,700. (Bureau of Census, 1980) Residential developments in the area contain middle and upper middle class homes with values well over one hundred thousand dollars. Yet numerous mobile homes account

for a significant number of dwellings in the county. Most economic backgrounds are represented in the school population.

Chapter 2

OBJECTIVES

Objectives of the Study

This study investigates the use of CD-ROM based books on the computer to improve reading comprehension as a supplement to the regular basal reading program in a second grade classroom.

CD-ROM based books allow the reader to read at an individual pace, identify unknown individual words, identify names of pictured objects, and hear the text read orally. As the CD-ROM based books read the stories aloud, phrases are highlighted improving the eye movement of the student and modeling proper oral reading technique. When reading silently, individual words may be selected by the student to be read orally and definitions or explanations of the meanings may be given. Pictures may be selected and the written word will be shown along with a pronunciation and definition. A list of selected words is kept so that the student and teacher may review them.

Anticipated Outcome

The Discus CD-ROM books empower the student to learn at an individual rate, allowing the student to gain as much skill and knowledge as can be assimilated. Thus, the use of this technology should improve reading comprehension achievement in the second grade students in the treatment class.

Variables that affected this study were the delay in the arrival of the Macintosh computer by a month and the two months that was required for the Psychological Corporation to resolve and finally ship the MAT 6 tests needed for the pre and post testing. These delays shortened the treatment time to the month of May. During May, numerous end-of-year activities occurred such as second grade testing for the gifted program and administering end-of-year reading and math tests. Less instructional time was available. A long period of treatment had been planned to begin in the late winter and was actually needed as study results indicate.

Chapter 3

TREATMENT STRATEGIES

Brief History of the Development of Educational Technology

Computers began appearing in classrooms in the late 1970's. At first, there were minimal memory classroom computers. Now those computers have been replaced with more powerful computers and peripherals presently referred to as technology.

Computers began appearing in public schools in the late 1970's. Computer labs were established in many secondary schools to teach programming. By the mid 1980's, computers were being placed in regular and special education classrooms at all levels for instructional use. (Anderson, 1990)

Software for classroom use typically consisted of drill and practice programs that were used to reinforce skills taught during group instruction. A few tutorial programs were also used to introduce new content or concepts. These programs had some branching aspects for remediation and allowed the student to

control the rate of learning. Both types of programs gave immediate reinforcement and feedback and teachers could review student performance. (Anderson, 1990)

Computers next became tools for learning. Database programs were introduced that enabled the student to search for information. Word processing software made the computer a tool for writing for both teachers and students. This freed the writer from the physical constraints of manually writing and recopying work, thus enabling the writer to concentrate on content and style. Spell checkers and grammar checkers pointed out errors and the writer became aware of better use of language. (Anderson 1990)

Today a third type of software is beginning to be used in classrooms. Much of it is on new storage devices, such as CD-ROM disks or laserdisks. Both hold a significant amount of material on one disk. Grollier's Electronic Encyclopedia was the first CD-ROM encyclopedia on the market. A single CD-ROM held the entire 20-volume encyclopedia. The 1989 Encyclopedia Brittanica CD-ROM contains the entire 26-volume encyclopedia plus numerous audio clips from famous speeches, music, and sounds from nature as well as short video clips of famous persons or events. This encyclopedia

uses the hypertext principal that layers information. Students can investigate one subject in-depth or jump to a related subject with just a click of a mouse button. (Anderson, 1990)

Hypertext is used to present many subjects in numerous content areas since it can contain text, graphics, video, and sound. It allows students to interact with the text. Most hypermedia contains more information than a traditional printed text on the subject. Reading a hypertext or hypermedia document is no longer a linear activity.

> Hypertext is very different from more traditional forms of text. The differences are a function of technology and are so various, at once so minute and so vast, as to make hypertext a new medium for thought and expression--the first verbal medium, after programming languages, to emerge from the computer revolution. (Slatin, 1990, p. 870)

Since hypermedia, which incorporates hypertext, contains a variety of materials, readers investigate the area of interest in-depth and may follow branches to more information related to the subject. The entire text may not be read, just those sections of interest to the investigating reader. Linking enormous quantities of material that would not normally be available in a conventional text, hypermedia allows the reader to perceive interrelationships.

(Slatin, 1990) Hypertext is "...changing our notions of literacy and changing how students learn from text;...." (Anderson, 1990, p. 9) It "...has become the highest rung on the ladder of information storage and delivery--far beyond books." (Blanchard, Frisbie, & Tullis, 1988, p. 698)

Description of the Technology

Technology is a broad term which encompasses everything from a digital clock to the most powerful main frame computers. In this study, the technology consists of an Apple Macintosh LC computer with 2 Megabytes of RAM and a 40 Megabyte hard drive, a mouse, a 12-inch color monitor, and CD-ROM disk drive. The Discis Books are actually programs on CD-ROM disks.

CD-ROM disks have read-only-memory (ROM). Information cannot be altered or added to them by the computer. These compact disks can hold as much 550 Megabytes of information in various forms, such as text or data, graphics or video, audio, or any combination of these. This is equivalent to 1,500 floppy disks. A floppy disk can contain the equivalent of 80 single spaced, typewritten pages. Each disk has a diameter of 4.72 inches and

looks similar to audio CDs. (Schamber, 1988) (Blanchard, Frisbie, & Tullis, 1988)

In the last few years, hypermedia technology has become increasingly in demand due to its versatility in both industry and education. Hypermedia can incorporate printed words, graphics, drawings, photographs, video, and sound. Its strength, however, lies in the nonlinear aspect of its programming which incorporates "layering" of information. These two aspects are the essence of its instructional strength.

A hypermedia program allows the user to explore information. Using a mouse and "buttons" on the screen, the user can select the information to be investigated. A simple click on another button provides more in-depth information on a subject or jump to a related subject and then return to the original position. The layering of information can greatly increase the understanding of a subject by allowing the user to gain further information about a particular word or concept and then returning to the original screen. This dynamic text places the user in control of the learning process and increases the potential for learning. Thus the computer with hypermedia programs has become a real tool for learning as it has

evolved into interactive textbooks. (Anderson, 1990) (Blanchard, Jay S., Mason, George E., & Daniel, Dan, 1987)

Discis Books

The Discis Books being used in this study are a product of Discis Knowledge Research Inc. of Canada. John and David Lowry founded the company in 1988 with the goal of creating a new format for learning and reading which would result in an improved level of understanding. Using hypermedia allows the reader to be in control of the learning process. The increased storage space of the CD-ROM allows ample capacity for an entire book and its vocabulary to be placed on one disk. ("Discis Books," 1990)

Discis Books initially resemble a printed book on the screen. This metaphor is used to relate the new experience on the computer to the known experience of a printed book. Each pair of pages has a delightful illustration along with the text. Music is played at appropriate times throughout. Pages are turned by the click of the mouse on the corner of the page. To investigate a word students may click with the mouse on that word and highlight it. The highlighted word responds to the options previously selected by the teachers. The computer may do one or more of the following:

pronounce the word, pronounce the word in syllables, give a definition of the word, and pronounce and define the word in Spanish. If a student clicks on a speaker, the book will be read to the student while each phrase is highlighted at varying speeds as preselected by the teacher. When a picture is clicked, the word represented by that picture appears along with pronunciation, definition, or pronunciation and definition in Spanish. The program keeps track of the words investigated by the student, so that further off computer activities can be undertaken. The Discis Books allow the reader to establish a comfortable silent reading pace and allow as much time as the reader needs to investigate vocabulary (see Appendix A for brochure on Discis Books).

The Discis Books used for this study were: Mud Puddle, The Paper Bag Princess, The Tale of Peter Rabbit, Benjamin Bunny, A Long Hard Day on the Ranch, Heather Hits Her First Home Run, Moving Gives Me A Stomach Ache, and Cinderella. All are considered appropriate for Grades Kindergarten through Three except Cinderella which is for Grades Three through Six.

Asset to Learning

Geoffrion and Geoffrion (1983) delineate the four primary elements that are needed for comprehension of a written passage. The first is an understanding of the vocabulary used in the text. The second involves using the syntax of the word order to infer meaning. Schema is used by readers to apply prior knowledge to the new text to organize information and infer new meaning. Lastly the manipulative skills; such as locating, remembering, organizing, and evaluating, are used to intregate all elements into an understandable format for comprehension. Each area is crucial for comprehension. However, some readers compensate for weak skills in one arena with stronger skills in another. A proficient reader flexibly uses all four elements.

Among the educators who believe in effectiveness of technology are the researchers concerned with the *"Apple Classrooms of Tomorrow* " (ACOT) project. The ACOT philosophy is that instruction should be learner-centered. Students should learn the interdependence of facts and be able to articulate and use them. In the research programs, children create their own knowledge. Computer technology allows the learner to interact with

information, manipulating it into a useable form in media rich classrooms. (ACOT: Philosophy and Structure)

The use of technology to help create a student centered instructional environment lends itself to adapting to the learning styles of the students. The use of computers naturally leads to cooperation among learners, but also allows the solitary learner to proceed on his own. Simulations and hypertext allow both 'sensing/feeling' and 'thinking' learners to approach experiences in the way they best perceive. The four learning styles of McCarthy (1990) can be addressed since hypermedia allows the learner to investigate in his own style. Technology easily addresses the visual and auditory modes of learning. The student can then manipulate the knowledge to obtain the desired results. Cognitive styles are addressed by the active involvement of the learner and the individualization available through the use of technology. Blanchard (1987) concluded that to enhance intrinsic motivation reading instruction must have focused goals and be governed by rules. Blanchard also stated that activities must vary and include "(a) challenge, (b) fantasy, (c) curiosity, (d) manipulation, (e) exploration, (f) desire for mastery, (g) hidden information, (h)

unlimited performance ceilings, (i) fast paced, and (j) task familiarity" (p. 32). The new uses of technology are highly motivational to the learner since these uses allow the learner to take control.

Self-paced inquiry empowers the student to be a self-initiating learner. The use of a computer in the classroom is a great motivator for children. It allows them to follow their natural curiosity while learning. The student sets the pace for the student's own learning.

After the initial six years of research ACOT found that "...technology is most powerfully used in learning activities where children are engaged in tasks they see as real work with real purpose." (ACOT: Philosophy and Structure, p. 3) This follows the philosophies of John Dewey, Maria Montessori, and Lev Vygotsky who felt that teachers should be facilitators of learning who help children construct their own capabilities and understandings by carrying out challenging tasks. (Collins, 1991) This emphasizes student instead of teacher centered learning. Children ascertain how to learn as well as problem-solving skills in their lessons on the operation of the technology. David (1991), as well as Strong,

Silver, and Hanson (1985) emphasized the need for enhancing student thinking. Their five principal goals of education, *involvement, synthesis, understanding, cultural literacy, and mastery*, were all achieved through the use of technology in the ACOT research. (ACOT: Philosophy and Structure)

To date the research results of the ACOT experiments have indicated that the children have slightly increased achievement test scores. ACOT projects that the rate of success is accelerating over time. The critic would note that the achievement scores have not made significant increases. The actual ACOT research and scores were not available to the researcher, and therefore, could not be evaluated here for substantiating these claims. The ACOT reports note that the achievement scores are based on the knowledge the students have gained and indicate that the traditional standardized tests used for assessment were not able to measure the growth in cognitive, social, and affective dimensions. (Baker, Gearhart, & Herman, 1990) Testing for higher order thinking skills, problem solving strategies, self-esteem, and cooperation was not used in the ACOT study. Anecdotal records indicate that there was a significant success in this area. The quantity and quality of the work

accomplished by the children in technology rich classrooms has increased significantly. These findings were the result of observing children engaged in collaborative learning, media-rich composing, modeling and simulations. (Dwyer, Ringstaff, & Sandholtz, 1991)

(ACOT: Philosophy and Structure)

The ACOT research has been summarized in the articles referenced above. However, the statistical data was not presented and therefore could not be evaluated.

An exhaustive search of ERIC, educational journals, Dissertation Abstracts International, and the Library of Congress was done and no research is available on Discis Books at this time since this type of technology is just beginning to emerge. In fact, this author has been working with Discis Knowledge Research, Inc. on this project. This is the first project of its kind that has been done. Discis Knowledge Research, Inc. has been very supportive in this research. The Discis Books set was loaned for the research. The initial practicum proposal was sent to Discis Knowledge Research, Inc. and has been shared with another researcher who will be beginning similar research this fall. Similar CD-ROM books are beginning to appear from other developers as educators discover the

value of this type of technology. No research is available on any other type of CD-ROM books at this time.

The Action Plan

In order to evaluate the achievements made by students using the CD-ROM books as a supplement to their regular basal reading program, pre and post reading comprehension achievement tests were given to each student in the control and in the treatment classes. The pretest was administered prior to the introduction of the CD-ROM based books. The treatment lasted four weeks. Then the post reading achievement test was administered to both classes.

The Metropolitan Achievement Tests (MAT6) was selected for this study since it had two versions of the test at each level that could be used as pre and post tests. It evaluated three broad areas of reading: vocabulary, word recognition skills, and reading comprehension. Results were given for each area as well as a total reading score. Results were given in raw scores, percentile, grade equivalent, stanine, and scaled scores. The scaled scores were used for the analysis of covariance. The "Primary 2" level for grades 2.5 through 3.9 was selected. The test could be administered in less than two hours. Since it had to be given twice, the impact on loss of

instructional time was a consideration. It also could be hand scored eliminating the lengthy time factor of sending tests away to be scored. This test is nationally norm referenced.

During the treatment phase of the study, each child in the treatment class received at least 15 minutes on the computer using the Discis Books at least 3 days a week. Although the MAC computer and the Discis Books software were new to the children, it is felt that the *Hawthorne Effect* was not a factor since the children were accustomed to using a computer to learn and since children today accept all types of technology as a normal part of their environment. The children in the control group did not have access to the CD-ROM based books. However, they did have the use of a computer in their classroom for normal drill and practice lessons.

The children worked in pairs reading the story silently. Words and pictures were investigated as needed. The children kept a record of the new words and the meanings. The vocabulary investigated was available on screen through a pull down menu if not recorded immediately. Meanings of new vocabulary had to written by the children. The children had to remember the definition and how the word was used in a sentence and then write an original

definition. This activity was designed to help reinforce the vocabulary learned. The children also wrote what was liked best about each story. Next, the best liked character was noted and the reasons for that choice. A place for individual ideas was also available. The "Story Log" was adapted from the teacher's manual that accompanies the Discis Books (see Appendix B for "Story Log").

Chapter 4

EVALUATION OF THE STUDY

Statistical Results

A Non-equivalent Control Group Design was used for this study. Gains in achievement were based on a simple analysis of covariance from the data collected on the pre and post reading achievement tests.

Validity issues include the numerous standardized tests given to young learners over the period of a month. The children find this type of testing difficult and are often frustrated by the length of the test and the numerous test questions that are above instructional level. The use of two different teachers for the study was necessary since the treatment was both visual and auditorial evident in the classroom. Therefore, there were two different teaching styles involved in the study. The children were not randomly selected for this study. The children used in the study were already assigned to a classroom and changes were not possible.

Mortality impacted on the number of students in each group since three students in the control group were not available for the entire study. These issues are noted here but not controlled. The length of the study was uniform in the two groups as well as the testing instrument. Due to the limited duration of the study and the small sample size involved, the results of this study cannot be generalized to an entire population.

The treatment group was selected because the teacher is a user of instructional technology. This teacher also had a Macintosh LC computer ordered for the classroom which is required to run the CD-ROM drive and disks. There was an Apple IIgs computer used in the classroom before the Macintosh LC arrived. The computer in this classroom was used daily by both the teacher and the students. It was an integral part of the learning environment. There was an Apple IIe computer in the classroom of the control group. It was primarily used for drill and practice exercises.

The control group was selected on the basis of the pretests. The children in this group more closely resembled the treatment group than the other second grades. The treatment group contained more children placed on a lower reading level than the control group.

The treatment group also contained four children with behavioral problems who were on behavior modification programs. The control group did not have any children on behavior modification programs. These behavioral problems could have effected the outcome of the research and the rate of learning of the students in the classroom.

The treatment group consisted of 20 children. Since there were only 16 children in the control group, an average score was computed and then multiplied by 20 in order to equate the group sizes. The difference in the group sizes could have had an impact on the results of the study since additional students in the control group could have inflated or deflated their overall results. Also, the children in the smaller control group would have received more individualized attention during reading instruction.

The Analysis of the Covariance indicated an F ratio of .967 with a *df* equal to 1/37. Since the F ratio is greater than .05, there was no statistical significance shown in this study. (Appendix C for Analysis of Covariance)

Other Results

Motivation through the use of the computer and the Discis books has not been statistically addressed in this study. The

teacher indicated that the children were highly motivated to read when working at the computer with the Discis Books. The children liked investigating new vocabulary and enjoyed the stories.

The comments of the children indicated a positive interest in reading the Discis books. In classroom conversations, the children indicated that it was fun to read with the Discis books. Hearing the stories also met with approval. All stated favorably about using the computer to read and learn. There were no negative comments made to the researcher. The children wrote letters to the researcher about the Discis books. The following comments have not been edited for grammar or spelling.

> My favorite discus book was Paper Bag Princess because I think it was very good. I like the books. I did not like I could not hear it.
> Brett

> My favorite discis book was Mud puddle. I like when it read to us.
> James

> My favorite dicus book was mud puddol because its a funny story. I liked the disus books because I like to read.
> Thomas

> My favirite discus book was Mud Puddle. Because every time she went out SPLAT! I liked the books because they read to you.
> Joshua

My favriot discus book was Paper Bag Pricess but I didn't like Cinderella. I leread to work the cantrol.
Johnny

My favorite discus book was A hard day at the Ranch. Because it talked to me. The are go story. I wish it has earphone. I like the computer.
Crystal

My favirte discus book was Peter Raddit beces it had my name I like reading the books becase they were funny I did nat like the books becase sometimes the compute turns the pages and so sometime I turn the pages.
Pete

My favorite book was Peter Rabbit and I liked it becuse they are fun to read with I love them they are terrific.
Heather

My favorite discus book was Paper Bag Princess because it was funny. I like every book. I did not like anything.
Alex

My favorite discus book was Paper bag Princess becouse it was very funny I like the books becouse they are grate I did not like non becouse they are grate.
Patrick

My favorite discus book was Mud Puddle and Paper Bag Princess. Because Thay were fun to read. I liked the books because thay are funny. I wish we had earphones.
Holly

(Appendix D for Complete Set of Children's Letters)

Motivation to read the Discus books was felt to have an impact on learning and achievement in reading.

Implication of Results

It was expected that this study would prove that the reading achievement of the treatment second grade class was statistically significant as compared to the control second grade class. However, this was not the case. Anecdotal comments of the students did indicate a high level of interest and excitement about reading when reading the Discis Books.

An implication of the results is that further research should be conducted in this area. Reading is a complex process and significant results are achieved over a period of time. A period of a year should show significant results. The limited time allowed for this study was inadequate to prove or disprove the impact of using CD-ROM based books, such as the Discis Books used in this study, to improve reading comprehension.

If this study were to be undertaken again, it is recommended that the study be conducted over an entire school year. Also, more activities should be intergrated into the curriculum to tie the content of the Discis Books into the entire body of study. The teachers' guide that accompanies the Discis Books is full of innovative and creative ideas for this purpose. The children should

be allowed to reread the books as often as desired. They should also practice reading orally with the books. Headphones should be used so that the children at the computer can hear the books, but classmates will not be disturbed. This equipment was not available for this study.

Chapter 5

FUTURE IMPLICATIONS

Further Use of CD-Rom Technology

This practicum attempted to show the value of empowering the student to learn to read using technology as a tool. Although this study was limited to one second grade class at one elementary school, it had been hoped that the results would indicate a need to continue this program for all elementary students. Instead, it indicated a need for further study. With further study, it is hoped that positive results would indicate that reading comprehension gains would justify the expense of the technology.

Justification for Further Growth in Technology

Since positive statistical results were not obtained, the results in the form of anecdotal evidence of the study along with recommendations for further study will be made available to the district Long Range Planning committee and the Board of Education.

The Long Range Planning committee has just completed writing three district goals centering on the use of technology as an instructional tool.

Chapter 6

RECOMMENDATIONS

Further Study

This study was limited to one treatment class and one control class. It also was limited in the length of time that the treatment was in place. It is recommended that this study be repeated for an entire school year with a larger population.

Further Application

Further study should be made on the use of hypermedia and CD-ROM based books at all levels in the school district. There are wonderful investigative programs available in the content fields, such as science, history, and English for students to learn by exploration. CD-ROM encyclopedias would help student research in the libraries. Teachers also should receive training on how to use this and other types of technology as a presentation tool in the classroom.

Dissemination of Knowledge

At inservice programs, CD-Rom based books and their accompanying instructional manuals should be demonstrated to the instructional staff. Inservice classes on the technology and its use in the classroom need to be presented as the technology is brought into the school district. The community needs to be made aware of not only the instructional power of the technology but also the excitement for learning it creates.

This researcher has already been asked to present the CD-Rom books at the Read-Aloud Delaware Conference next spring.

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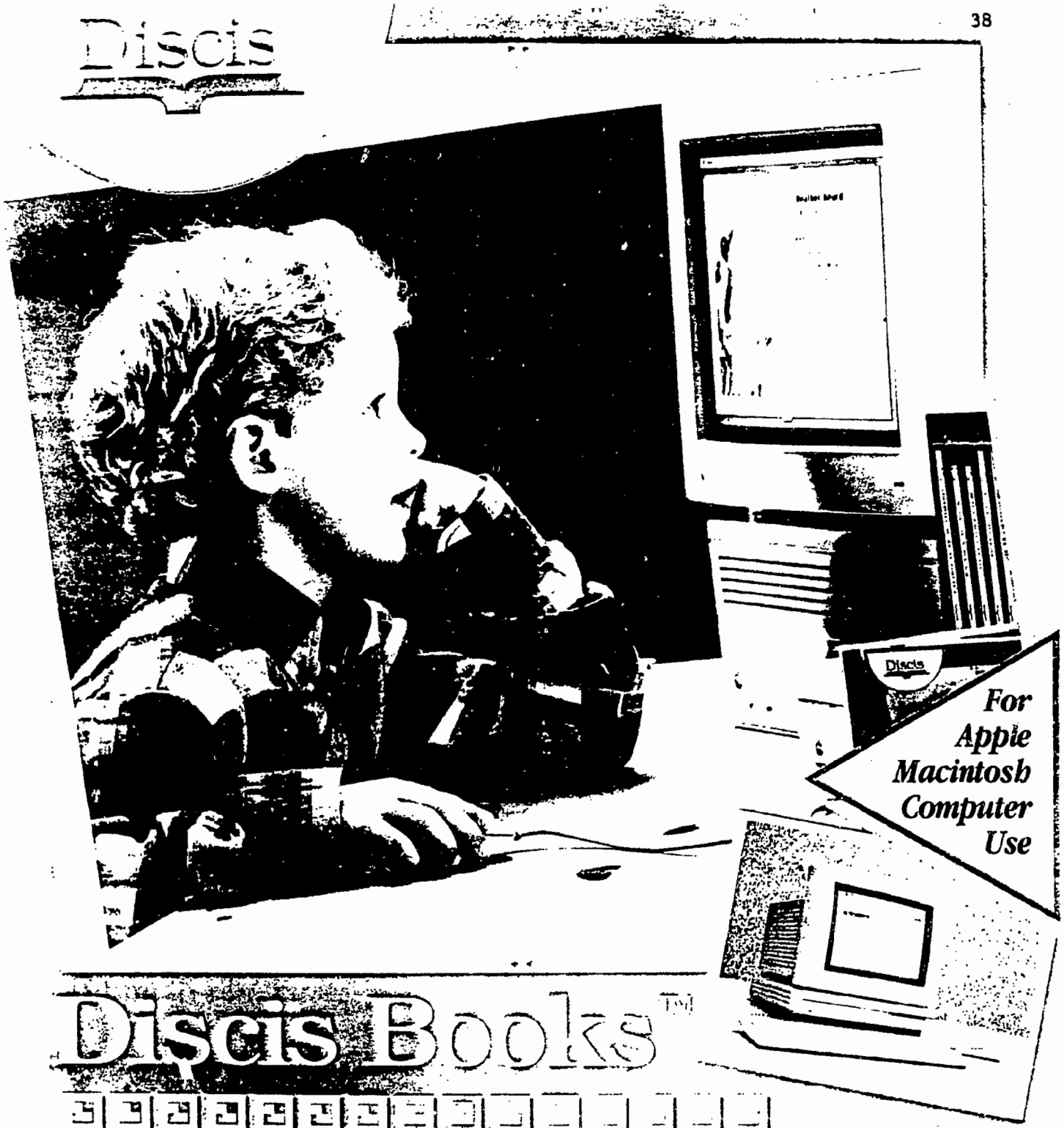
Appendices

APPENDIX A

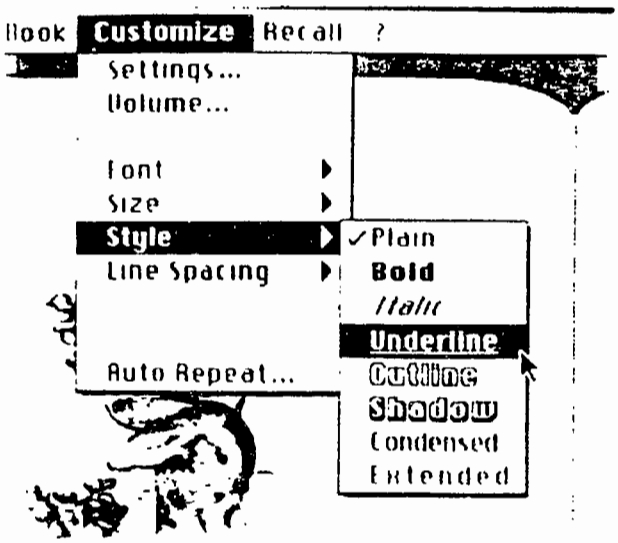
Discus Books



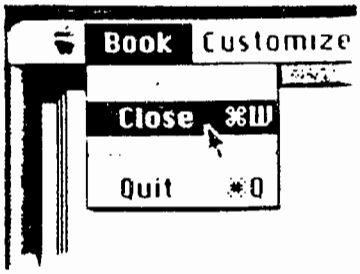
Discis Books™

Adventures in Learning

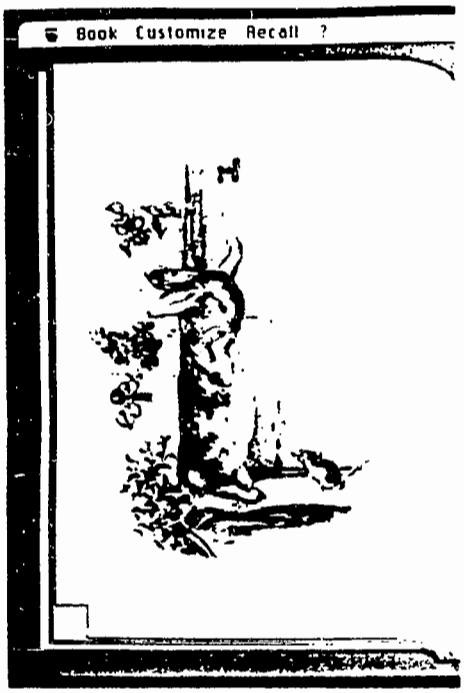
BEST COPY AVAILABLE

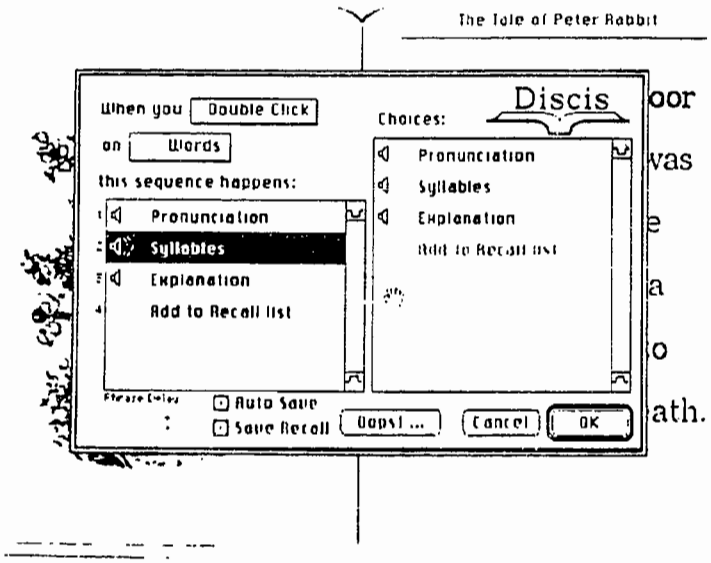


As a teacher or parent you can facilitate the child's learning experience by individualizing your Discis Book's presentation to meet the personal needs of each user. By using this menu you can customize the font, size, style and line spacing to suit each child's special needs.



Close one book and open another easily from this menu or use "Quit" to end your Discis Book session.



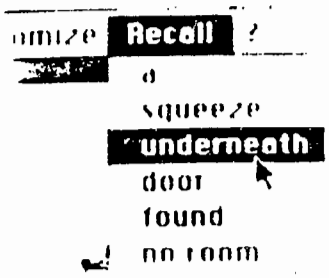


You can customize what happens when the reader clicks, double-clicks or press & holds on words, pictures, loudspeaker icons and page corners. Just move items from 'choices' on the right into the sequence on the left. Autosave will record these custom settings and create an automatic bookmark upon closing. The recall list may also be saved. In the ESL Discis Books with translations, pronunciation in the reader's first language is also available for every word and picture element.

locked, and there

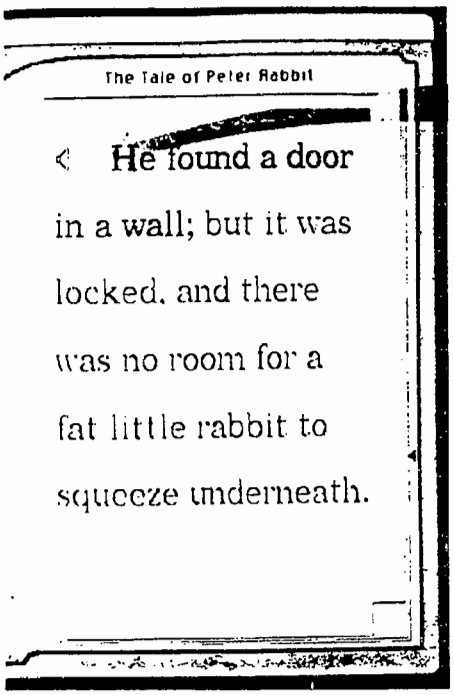
was **no room** for a

Learning has never been as much fun! J
double-click or press & hold on any wor
element to obtain pronunciation, syllable
context explanation of every word in the
interactive way to learn allows the reade
total control of his or her own learning e
Learning has never been this easy eith
don't need a keyboard to use Discis Bo
point and click with the mouse

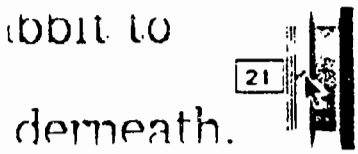


As a parent or teacher you can review with the user which words they had difficulty with and clicked on for more information.

A comprehensive oral help facility aids the user at any point they request help. Turn help on and your mouse pointer will change into a "?", a voice will then give a full explanation of any feature you point to.
In Discis Books with translations "Help" gives aid in both English and the user's first language.



Click, double-click or press & hold on this loudspeaker icon to hear a single sentence or the rest of the Discis Book with music and sound effects. Or perhaps you want a slower reading with a variable time delay between phrases which will aid reader comprehension. As you read, phrase by phrase text highlighting is synchronized with the storytelling for easy following of text.



Move this marker up or down as a quick and easy way to move to a different part of the Discis Book.

ust click.
l or picture
s or an in-
text. This
r to be in
:perience.
er! You
oks, just

You can click on either the left or right page corners to turn pages.

Discis Books™

An Exciting Interactive Learning Medium

What are Discis Books?

Discis Books are a new medium for learning. They provide for improved understanding and the reader interacts in such a way that he is in total control of his own learning experience. Discis Books show a child that learning can be a fun and rewarding experience... truly an adventure in learning!

How do Discis Books Work?

Books by well known children's authors appear on the screen as actual pages of a book with the original text and illustrations. The reader's understanding is enhanced with a variety of real voices, music and sound effects. Click on the loudspeaker icon and the story will begin... phrase by phrase highlighting is synchronized with the storytelling for easy following of text. Greater comprehension is encouraged by a mere click of the mouse on any word or picture element to obtain pronunciation and syllables, and an in-context explanation of every word in the text. Translations such as Spanish, French and Cantonese are available for selected books. In these ESL books, pronunciation in the reader's first language is present for every word and picture element.
A comprehensive oral help facility gives aid in both English and the user's first language.
Discis Books enable the teacher or parent to facilitate the learning experience by individualizing the book's presentation to meet the personal needs of each reader. Sentences can be presented orally in the second language, or a slower reading with a variable time delay between phrases can be given.

What are the Equipment Requirements?

Discis Books are distributed on CD-ROM and read using any Apple Macintosh® computer, black and white or color, including the LC, the Classic and IIsi, and a CD-ROM drive. Neither a hard drive nor a keyboard is necessary. Use of a mouse alone makes reading Discis Books very easy, even for those unfamiliar with computers.

How are Discis Books Packaged?

Discis Books can be purchased individually or in libraries of multiple books. Each library is complete with a user manual and curriculum material, which covers topics including whole language learning, classroom organization and management, story preparation, skill development, related post-reading activities, tracking, record keeping and evaluation.

Who Should Use Discis Books?

EVERYONE! Discis Books are fun, easy to use, entertaining but educational too!
Discis Books are appropriate for kindergarten through to grade 12, both first and second language learning and the teaching of themes and whole language learning.

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APPENDIX B

Story Log

Story Log

Name: _____

Story Title: _____

Date Started: _____ Date Completed: _____

New Words Meanings

_____

_____

_____

_____

_____

_____

_____

_____

What I liked about this story: _____

_____

_____

The character I liked best was: _____, because

_____

_____

Special Notes: _____

_____

APPENDIX C

Analysis of Covariance

	A	B	C	D	E	F	G	H	I	J	K	L	M
1													
2						Total Reading Comprehension							
3						Stanine Scores							
4													
5													
6	Treatment Group							Control Group					
7	Student	Pretest		Posttest		Pre X Post		Student	Pretest		Posttest		Pre X Post
8	S1	612	374544	636	404496	389232		S1	537	288369	528	278784	283536
9	S2	573	328329	599	358801	343227		S2	539	290521	533	284089	287287
10	S3	547	299209	538	289444	294286		S3	619	383161	664	440896	411016
11	S4	559	312481	563	316969	314717		S4	569	323761	594	352836	337986
12	S5	556	309136	533	284089	296348		S5	565	319225	586	343396	331090
13	S6	518	268324	525	275625	271950		S6	565	319225	605	366025	341825
14	S7	582	338724	577	332929	335814		S7	579	335241	586	343396	339294
15	S8	612	374544	615	378225	376380		S8	619	383161	618	381924	382542
16	S9	644	414736	642	412164	413448		S9	571	326041	594	352836	339174
17	S10	575	330625	559	312481	321425		S10	544	295936	548	300304	298112
18	S11	529	279841	563	316969	297827		S11	554	306916	555	308025	307470
19	S12	542	293764	563	316969	305146		S12	556	309136	538	289444	299128
20	S13	545	297025	563	316969	306835		S13	524	274576	545	297025	285580
21	S14	605	366025	584	341056	353320		S14	511	261121	542	293764	276962
22	S15	547	299209	550	302500	300850		S15	589	346921	586	343396	345154
23	S16	518	268324	540	291600	279720		S16	551	303601	522	272484	287622
24	S17	552	304704	530	280900	292560							
25	S18	569	323761	575	330625	327175							
26	S19	597	356409	608	369664	362976							
27	S20	544	295936	532	283024	289408							
28													
29	Sum	11326	6435650	11395	6515499	6472644			11240	6333640	11430	6560780	6442223
30						To equate to 20 subjects, averages were found & mulitiplied by 20							
31													
32													

	A	B	C	D	E	F	G	H	I	J	K	L	M
33	Step 2		Add the scores in each Pretest & Posttest column (see row 28)										
34													
35	Step 3		Square of all Pretests added together										
36			12769290										
37													
38	Step 4		Sum of 2 Pretests										
39			22566										
40													
41	Step 5		(sum of 2 pretest) squared divided my number of students (40)										
42			12730608.9000										
43													
44	Step 6		Subtract Step 5 from Step 3										
45			38681.1000										
46													
47	Step 7		Square sums of Pretest and add square; divide by number of scores in Pretests										
48			12730793.8000										
49													
50	Step 8		Subtract results of step 5 from results of step 7										
51			184.9000										
52													
53	Step 9		Subtract value of Step 8 from Step 6										
54			38496.2000										
55													
56	Step 10		Square of all Post test added together										
57			13076279										
58													
59	Step 11		Add the sums of Post tests										
60			22825										
61													
62	Step 12		Square the result of Step 11 & divide by the number of students (40)										
63			13024515.6250										
64													

	A	B	C	D	E	F	G	H	I	J	K	L	M
65	Step 13		Subtract Step 12 from Step 10										
66			51763.3750										
67													
68	Step 14		Square sums of Posttest & add; divide by number in column (20)										
69			13024546.2500										
70													
71	Step 15		Subtract the results of Step 12 from Step 14										
72			30.6250										
73													
74	Step 16		Subtract Step 15 from Step 13										
75			51732.7500										
76													
77	Step 17		Multiply each Pretest score by its paired Posttest & add all products										
78			12914866.50										
79													
80	Step 18		Multiply Step 4 by Step 11 & divide by number of XY pairs (40)										
81			12876723.7500										
82													
83	Step 19		Subtract Step 18 from Step 17										
84			38142.75										
85													
86	Step 20		Multiply each Pretest sum in Step 2 by its paired Posttest sum and add the 2 products										
87			& divide by number of pairs in each column (20)										
88			12876648.5000										
89													
90	Step 21		Subtract Step 18 from Step 20										
91			-75.25										
92													
93	Step 22		Subtract Step 21 from Step 19										
94			38218.0000										
95													
96													

	A	B	C	D	E	F	G	H	I	J	K	L	M
96	Step 23		Square Step 19 & divide by Step 6										
97			37611.89										
98													
99	Step 24		Subtract Step 23 from Step 13										
100			14151.48										
101													
102	Step 25		Square step 22, & divide by Step 9										
103			37941.8105										
104													
105	Step 26		Subtract Step 25 from Step 16										
106			13790.9395										
107													
108	Step 27		Divide Step 26 by degrees of freedom for the adjusted within-groups measures										
109			Degrees of freedom = N - a - 1, where N is the total number of XY pairs (40)										
110			and a is the number if different experimental groups (2)										
111			372.7281										
112													
113	Step 28		Subtract Step 26 from Step 24										
114			360.5429										
115													
116	Step 29		Divide Step 28 by number of degrees of freedom for adjusteded between-group measures										
117			Degress of freedom value is a - 1, where a is the number of different experiental groups										
118			360.5429										
119													
120	Step 30		Compute the F ratio by dividing the results Step 29 by Step 27										
121			0.967308077896										
122													
123	df		df = (a-1)/(N-a-1)		=			1/37					
124						.1%=.01=		12.61					
125						5%=.05=		4.08					
126						20%=.2=		1.72					
127			F value is greater than .05 level and therefore show no significance										

APPENDIX D

Children's Letters

Jule 1, 1992

Dear Mrs. Standish
My favor,te dischsbock
was Paper Bag Princess
because I think it was very
good. I like the books.
I did not like I could not
hear it.

Brett

Jan 1, 1992

Dear Mrs. Standish
My favrate was discus book was
Mud puddle. I like when it read
to us I did not like benjemin
bunnx

from,
Jane

10

Thomas H. 6-1-92

Dear Mrs. Standish,

My favorite dicus book was mud puddle because its a funny story. I liked the dicus books because I like to read. I did not like cinderella.

C3

C4

Dear Mrs Standish,

My favirite dis eus book was Mud Puddle. Because every time she went out SPLAT!

I liked the books because they read to you.

Your friend,

Joshua Bumgarner

C5

C6

Mrs. Standash,
My tavriot discus book
was Paper Bag Pricess
but I didn't like Cinderella
I Lerud to work the
control.

from
Jenny X
W.

June 1, 1992

Dear Mrs. Standish
My favorite discus book was A hard day at the Ranch. Because it talked to me. The are go story. I wish it has earphone. I like the computer. I like you a lot. You are nice. Testing is hard. But it is ok.

from
Crystal

2

Peter

Dear Mrs. Stamdese

My favirle discus book was Peter Raddit becesit had m name I like reading the books becase they were funny I did nat like the books becase sometimes the computer turns the pages and so sometimes I turn the pages

fram

Pete

Dear Mrs. Standish My favorite book was ~~Peter Rabbit~~ and I liked it beagse they are fun to read with I love them they are farific so are you

love,
Heather

June, 1, 1992

Dear Mrs. Standish,
My favorite disgus book
was Paper Bag Princess.
because it was funny.
I like every book
I did not like anything.

Love
Alex,

June 1, 1992

Dear Mrs. Standish

My favorite discus book was Paper bag Princess because it was very funny I like the books because they are grate I did not like non because they are grate.

Your friend
Patrick

Dear Mrs. Standish,
My favorite discus book was
Mud Puddle and Paper Bag Princess
Because They were fun to read.
I liked the books because they
are funny.
I wish we had earphones.

Love Holly
Wilson

Dear Mrs. Standish
My favorite discus book
was Bengermin Bunny becouse
heis cutel I Liked the books
becouse their fun. your friend
Pamela

June 1,1942

Dear Mrs. Standish
My favrite
was Peter Rabbitt
because it was nice
I like the books contord

from: Matthew Farren

Dear Mrs. Standish, My
favorite discus book
was Peter Rabbit because
he hops around funny
from Alneshia G.

11 #

Dear Mrs. Standish,
My fayrite discus book was
MudPuddle because
It was funny
I did not Like
Peter Rabbit
I wish it had head
phones

Stacy,

Michelle jan. 1, 1992

Dear Mrs. Stadish
My favorite discuss book was the Paper Bag Princess because it was funny. I liked the books a lot.

6-1-92

Dear Mrs. Standish

My favorite discus book
was Mud Puddle and Paper Bag
Princess because in the she
was undress in the bathtub.
the Princess undress with
her clothes off. I like the book
because I saw everything
on her body. I learn how to
work the controls. I did not
like in the first that was
in Mud Puddle because the

the water Protectct I want to it. In the seoncde one, in Paper Bag. Princess I did not like in their because that smoke was their.

The END.

June 1, 1992

Dear Mrs Standish,
My favorite discus bookwas Benjamin Bunny. Can you put some earphone I Likef he books alot.

From
Amie,

June 1, 1992

Dear Mrs. Stadish,

My favorite discus book was Mud Puddle and Paper Bag Princess. The part that I liked in Mud Puddle when the Mud Puddle went all over her. The part in Paper Bag Princess was when she got him out of the cage.

Andrea