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ABSTRACT

This study describes and analyzes the use of CD-ROM talking books in a third grade classroom over a 4-month period. One area of interest was in how the teacher used the storybooks in day-to-day efforts to foster learning, especially in the area of language arts. Also examined was the sense children made of these media and the overall impact the books made in the classroom. Data was gathered through observation, the use of a video camera (so that data could be analyzed repeatedly), and formal interviews. The data was divided into four categories for analysis: (1) the suitability of CD-ROM books in language arts and thematic units-based curriculum; (2) the teacher's best intentions; (3) CD-ROM books as personality; and (4) the children's use of the books in terms of cooperation versus competition. The data revealed congruencies and incongruencies in terms of the suitability and the teacher's intentions; also noted was the fact that computers can take on a role that goes beyond their utility and in a class where cooperation was the norm--characteristics of the CD-ROM books seemed to bring out power struggles and selfish behavior. (Contains 40 references.) (AEF)

CD-ROM Talking Books: A Case Study of Promise and Practice

by

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CD-ROM Talking Books: A Case Study of Promise and Practice

Computer technology in elementary and secondary education is becoming increasingly sophisticated, and new and complex computer software is being designed and presented to educational institutions rapidly. As a result, computer technology is increasing in use in both elementary and secondary classrooms. Unfortunately, as Ohanian (1984) notes, many computer innovations introduced into school systems are praised immediately for their "newness, ingenuity, and their graphic displays" (p. 30) as opposed to their pedagogical applicability. Multimedia is an example of a contemporary complex computer technology where the sophistication of the technology can dazzle users with impressive graphics, live video, real voices, and music and sound effects. CD-ROM talking books combine multimedia features such as animation, quality illustrations, music with text, and on-line assistance features. Some of these features are created to enhance the reading experience (e.g., music, animation) while others are designed to help young readers deal with difficult or unknown words and concepts (e.g., pronunciation and vocabulary assistance). Because of these sophisticated features, CD-ROM storybooks are advertised by publishers and software designers as advantageous to elementary language arts instruction (Martin, 1992; Discis Knowledge Research, 1993; Truett,1993).

As mentioned above, software designers and educational administrators seem to base more of the praise for new computer innovations on novelty and *perceived* educational change than on any demonstrated benefit to pedagogy. In a time where computer programs are being designed rapidly for education, more emphasis is being placed on what the computer can do than on determining what the computer can do for teachers and students (Ohanian, 1984; Janowiak, 1990; Carbone, 1995).

Research Questions

This study proposed to describe and analyze the use of CD-ROM talking books in one Grade 3 classroom over a four month period. Because of the unique features available in CD-ROM storybooks, which are examples of a complex multimedia technology, we were interested in how the Grade 3 teacher made sense of them in her day-to-day efforts in fostering learning, especially in the area of language arts. We were equally interested in the sense children

made of these media. Finally, we desired to examine the overall impact the books made on the classroom. It is important to note that this study was not designed to examine the value of CD-ROM talking books in relation to overall reading achievement or the specific value of any particular type of CD-ROM talking book.

Rationale

This study is relevant for two reasons. First, the proposed study responds and contributes to the stated need for teacher and classroom based research on new computer technologies (Janowiak, 1990; Olson, 1992; Miller & Olson, 1994; Miller, Blackstock, & Miller, 1994). Both practicing teachers and educational researchers have stated that the role of new technologies should be researched and established based on observation of teacher activity and on teacher reflection. Without research on its effectiveness in the classroom, a computer innovation may be considered superfluous. Olson (1992) asserts this notion by suggesting that the computer is merely a teaching tool that should be incorporated and validated by the teacher. With regard to multimedia, Miller *et al.* (1994) suggest that CD-ROM storybooks must be researched through observations of teacher integration because such use represents a descriptive demonstration of the use of the storybooks within the "real world" of the classroom (p. 203).

LITERATURE REVIEW

Multimedia, according to Burnett (1994), represents the "next stage in the evolution of computer software" (p. 15), and can be defined as computer software that integrates text with such features as high quality graphics, animation, sound and music effects, and still photos or live action video within one program. Multimedia programs also allow the user to interact with the program. For example, in a given multimedia program, a student can interrupt the regular progression of the given text and activate animation or music. In other words, the user is "more than a mere observer", and can control how the program will be presented (Anderson, 1989, p. 91).

Multimedia is being advocated by program designers, educational researchers, and librarians as being potentially beneficial to education as it meets the individual needs of a student by presenting material in a variety of

different formats (Leu, Gallo, & Hillinger, 1994; Reinking. 1994; Shank, 1994). For example, a student can be given visual modeling of a given passage by accessing the built-in animation feature or can be given added expression through sound effects. Such features may be useful as students vary in terms of learning preferences, that is, where some students in a given classroom might prefer music to enhance their learning experience, others might benefit from supplementary visuals.

In an extension of this notion, multimedia is promoted as an ideal innovation for education as it links and presents information the way the human mind acquires and understands information, and, therefore, facilitates learning (Anderson, 1989; Burnett, 1994; Shank, 1994). Because students acquire information from many avenues and points of view, multimedia accommodates this natural learning process. Concepts should be presented in many forms to be completely understood, and such is the way material is presented within the multimedia environment. Other such claims about multimedia technology are that it enhances and sustains independent learning, and develops learner control as it is the students who are responsible for their learning through manipulating the presentation of the textual material (Burnett, 1994; Reinking, 1988; 1994). Hence, multimedia is promoted as a sophisticated, capable, and consequently beneficial innovation to education.

CD-ROM Talking Books

A recent example of an interactive multimedia software program that has been designed specifically for reading within the classroom is the CD-ROM talking book (Parham, 1993). The text body of these storybooks is primarily narrative, composed of children's classic stories, literature, and poems. Narration of the story is in a human voice that, according to Truett (1993), adds expression to the story and consequently reinforces meaning of the story. In addition, the text of these stories is accompanied by high quality illustrations, most of which are replications of the original storybook versions.

While the illustrations are striking, a notable feature of many of the CD-ROM storybooks is the animation. Animation is characteristically presented in the form of hidden hotspots (Truett, 1993; Parham, 1993). As readers progress through the text, they can click the mouse button on selected pictures and have elements of the illustration move or perform amusing activities. CD-ROM

storybooks also provide the reader with immediate on-line assistance features that can also be accessed immediately and with little effort. Specifically, a reader can reread any page, have selected sections or the entire story read aloud, and have a word defined and pronounced in syllables in instances of uncertainty. Specific to certain storybooks is the ability to have the book read aloud in a different language.

In terms of benefits to the reading process, many claims have been made by authors, educational theorists, and software designers as to the potential of CD-ROM storybooks to fostering literacy (Discis Knowledge Research, 1990; Martin, 1992; Parham, 1993; McCarthy, 1993; Balajthy, 1994). Primarily, CD-ROM storybooks are believed to lead to an increase in vocabulary and to facilitate the reader's comprehension. Because difficult words can be accessed immediately and defined and/or pronounced in syllables, readers may obtain new understandings and pronunciation of uncertain words and terms. In addition, these new words can be reinforced as the student can have them repeated or redefined as many times as needed.

Many statements have been made as to how these storybooks can be placed with ease into a curriculum (e.g., McCarthy, 1993) and how the technology can be integrated with other subjects for unit organization, but only one investigation described their actual use (Balajthy, 1994). In his 1994 case study using one college computer consultant, two preservice teachers, and one kindergarten teacher, Balajthy described how Benjamin Bunny, a storybook placed within the multimedia CD-ROM environment was used in a kindergarten classroom.

Although Balajthy (1994) stated that the storybook was helpful in the classroom context because it served as the root of many activities and provided convenient access to aid in times of uncertainty, he did not describe exactly how the features were used and how the various features contributed to a more fulfilling unit. Rather, the CD-ROM storybook was used in rereading sections before many separate activities, including phonics and sentence instruction. It appears that students took turns rereading the story on the computer but participated as a class in the activities. Although Balajthy (1994) states that such a technology has a "place" in the classroom (p. 9), he did not indicate exactly what that place is for the CD-ROM storybook, nor did he demonstrate a role for these books in his case study. Realistically, it seems as though the

CD-ROM storybook version could have been filled just as effectively by the original hard cover version of Benjamin Bunny.

Research

Research in the Area of CD-ROM Storybooks

As stated above, research on the effects of CD-ROM storybooks is virtually non-existent. However, one study that has offered some direction about the benefits of the assistance features was carried out by Miller, Blackstock & Miller (1994). This study was conducted with 4 fourth grade students and their use of three of the available assistance features: word pronunciation, syllabification, and word definition. Specifically, they examined whether using these features would decrease the amount of occasions readers sought assistance when confronted with difficult words during repeated readings of the same story. In other words, Miller *et al.* observed whether using the accessible assistance options would be aid enough to eventually decrease the readers' needs to seek assistance. As the participants reread the books, the number of requests for assistance was observed. The results of the study demonstrated that as the students reread the CD-ROM book, with its immediate assistance features, students accessed progressively less.

The Classroom and the CD-ROM Environment

Truett and Ho (1986), while determining whether educational software producers field tested new software amongst teachers, conducted a study that elicited information from 396 different software companies. While only 31.6 % of those companies surveyed responded to the questionnaire, it was sufficient in demonstrating the discrepancy between the product and its actual use in the classroom. Only half of the companies stated that they field tested all of their software among practicing teachers, and not all of the results of the field tests were reported in the companies' publications. These results suggest that it is not always a priority for software designers to determine whether their software is amenable to classroom use. Interestingly, as Watson (1987) rightfully points out, such use is supposedly the purpose of educational software. Alifrangis (1990) states that the design of much educational software is based on educational theory rather than realistic use and need. Such is the danger with

CD-ROM storybooks, which might represent "the latest in technological advancements" but not the latest in classroom need (Discis Knowledge Research, 1993).

Little has been established about the use of the CD-ROM storybook in the classroom environment. While the Miller *et al.* (1994) study may demonstrate that the books can have positive effects on students' reading skills during independent reading, it does not demonstrate the effects of these books within the classroom environment. Because the four participants were removed from their regular classrooms and observed in a different setting, the question of real life classroom integration was not established in this study. Also, the study focused only on three available features of the technology. Because CD-ROM storybooks are heralded for their myriad features and the roles such features may play for different students in various contexts, studies on how many of the features are adopted in the classroom by both teachers and students, and how they effect classroom routines, are required to begin to address these claims.

A small amount of field-testing has been conducted on the reactions to the books in a classroom atmosphere. Both Balajthy (1994) and Discis Knowledge Research (1990) discuss case studies of successful integration of CD-ROM storybooks into elementary classrooms. For example, a report from Discis Knowledge Research (1990) describes how Sharon Smith, an elementary teacher, incorporated Benjamin Bunny into her second and third grade curriculums. She observed that the books were especially effective amongst her students with weaker reading skills as they were more motivated and stimulated to read. In addition, Smith noted her students became more independent as readers because they did not have to rely on the teacher for necessary assistance. These statements are corroborated by Balajthy (1994) who, while describing his case study, states that the books were adapted into the classroom with enthusiasm by the students and were considered motivating. He suggested that the books were ideal for the students of the classroom because they served the rereading needs of the kindergarten students. While these studies are promising in substantiating some of the claims, they are few and lack detail.

According to McCarthy (1993), there is a wide demand by teachers for materials that suit their curriculum. However, it is insufficient to list possibilities of an educational technology without observing how teachers use

it within their classroom arenas. Experience has demonstrated that teachers tend to use those technologies that are compatible with their classroom practices, regardless of the glitz and complexity of the machinery (Miller and Olson, 1994; Miller et al., 1994; Boag & Massey, 1981). As both Miller & Olson (1994) and Bruce & Rubin (1993) observed, prior practice tends to shape use of the technology rather than the commonly accepted notion that technology is a rudder that guides practice. Thus, CD-ROM storybooks must be considered in this light.

For example, in their 1981 study, Boag and Massey showed that the technology being demonstrated lacked suitability for classroom use. Cora, one of the two teachers observed, stated that she was initially impressed and excited by the technology but that the excitement eventually turned into disenchantment as the technology proved inappropriate for her existing curriculum. The result of Cora's use of the technology, according to the researchers, was that "the pedagogical perspective of the technology and the perspective held by [the teacher] were obviously at odds" (p. 45).

Similarly, in their intensive case study of one first grade teacher, Miller and Olson (1994) examined Ms. Jensen's use of a computer database and word processor in her classroom. Like Cora and Annette of the Boag and Massey (1981) study, Ms. Jensen expressed some general discontent with software that did not match her classroom practices and ideals. Through observation the researchers affirmed that Ms. Jensen tended to use the computer in ways that matched her teaching routines and styles. A major conclusion of this study was that we should not assign computer technology too much power, and that we should realize that the benefit of the computer is a result of teacher imagination, belief, and experience.

Conclusions and Directions for Research

The ultimate point to be made with these case studies is that the sophistication of the technology should not be the selling point to schools and school boards. Rather, whether the computer technologies are suitable for classroom use and whether their use can benefit student learning should be the basis for acquisition. The above studies demonstrate that teachers do not invariably accept or appreciate technology, especially technology that is inconsistent with their curriculums or with their students' needs. At times, technology is not always suitable for the classroom, regardless of its complexity

and packaging. Therefore, as demonstrated through these studies, research and field testing amongst teachers within their classroom environments are of utmost importance.

In introducing her study investigating the effects and results of three different teaching styles (monitoring, coordinating, and mediating) on the use of instructional software among three Grade 5 teachers, Benaloh (1993) argues that while there are many who encourage computer use in education, it cannot be taken for granted that a given computer program will fit into the classroom. Further, she states that research on the effective use of computers often seems to ignore the impact of teachers' actions. Such actions are necessary in determining the worth of the technology on student learning (Boag & Massey, 1981; Benaloh, 1993). This final point is also supported by Miller *et al.* (1994), who believe that teachers should be the ones to consider whether CD-ROM technology is suitable for an elementary language arts curriculum.

METHODOLOGY

Sample

This investigation used an intensive case study format where one Grade 3 classroom teacher was observed in her use of CD-ROM storybooks. As a result, all students in the classroom were also considered participants as they were observed in their daily use of the CD-ROM storybooks. The participant was chosen purposefully for the following reasons: grade level, teaching experience, and perceived familiarity with technology. First, many of the CD-ROM storybooks used in the study are suited to a Grade 3 classroom. Second, with 18 years of teaching experience, the participant was described by her principal as a knowledgeable, able, and confident teacher. This depth in teaching experience and ability was important as we desired to study a teacher with an established reputation for excellence using established methods. Finally, the participant made frequent use of the existing technology in her classroom; thus, familiarity with technology, per se, was not an issue.

Time Frame

Data were gathered throughout the fall term of 1994 and into the winter of 1995. Classroom observations were made on a daily basis from early October to the end of January. Regularly, researchers were working with the

participant for the entire day. Interviews with the teacher were conducted privately prior to the observations, during the observation period, and after the observation period.

Data Gathering Strategies

In obtaining a detailed description of teacher use, application, and reflection on the worth of the storybooks, several methods of data gathering were used. First, the researchers observed consistently those activities the participant designed and executed with the use of the CD-ROM books. This procedure included observing the teacher's explanations, use, organization, and emphasis of the features of the storybooks during the term as well as the students' use and interaction with the books. In observing all activities that involved CD-ROM storybooks, including preparation activities and training sessions with the students, we were able to compile detailed and extensive field notes about their use. In addition to field notes, a Sharp SlimCam video camera was used to glean observation data that could be analyzed repeatedly.

A third form of data gathering focused on formal interviews. These interviews were negotiated with the participant and scheduled according to her availability. The scheduled interview sessions encouraged the participant to reflect regularly on the process of integration. The length of the interview sessions varied and each was audio taped and transcribed into typed notes as data. These interviews were designed specifically to gain response from the participant as to her reactions to the CD-ROM storybooks and ideas for integration. This format also enabled the researchers to gain information on the participant's changes in attitude or ideas, if any. In addition to the formal interviews, informal questions were posed to the participant during the normal day to clarify situations.

Pre-study Preparation

Prior to the actual study in the classroom, a number of activities were conducted. Because one of the intentions was to further the Boag and Massey (1981) study by comparing the teacher's initial reactions to the multimedia technology to actual use, it was necessary to conduct pre-study interview sessions with the participant. Through interviews, we determined information about the participant's current teaching practices, language arts curriculum, and opinions about the use of computers in teaching language arts and in

using technology in the classroom in general. Also, the researchers asked questions to establish context concerning the participant's current teaching practices.

Second, the participant was trained to use the CD-ROM storybooks. The actual study did not begin until both the participant and the researchers were comfortable with the participant's knowledge with the technology. As different types of CD-ROM storybooks were used that contained varied features, the training session illustrated the features of the different types of books. The researchers demonstrated all of the available features and then asked the participant to practice and redemonstrate these features

After training, the researchers conducted another audio taped interview designed specifically to determine the participant's attitude toward the technology and specific plans for the storybooks. This interview session involved asking the teacher how she planned to incorporate CD-ROM books into her curriculum, what her impressions were of the technology, and whether and how the technology could be considered beneficial to her students. This interview also established a basis for determination of teacher change, that is, to compare her original espoused notions of use with action. Finally, the researchers observed classroom activities for approximately one week before the introduction of technology in order to establish context for teaching styles, classroom procedures, and use of reading materials and reference aids.

Materials

The participant was given two Macintosh LC 575 computers, equipped with a built-in CD-ROM drive, that were placed into a classroom location of the participant's choice. Only two computers were placed in the room because we thought that such a number was realistic given our observations of the amount of technology typically found in schools. The teacher also had access to three other computers in the classroom although they were not equipped with CD-ROM drives. The participant was given approximately 45 CD-ROM storybooks to use at her discretion. Most of the books were produced by two companies, Broderbund (*Living Books)* and Discis Knowledge Research (*Discis Books)*, although CD-ROM talking books from other companies were included as well. The books contained various genres such as narratives, poems, and non-narrative texts. The properties of CD-ROM storybooks vary by publisher and therefore different assistance features are available. It was not the

purpose of this study to evaluate and compare the different features although how the teacher and children viewed these differences was of interest.

Role of the Researchers

The role of the researchers was considered carefully in this study. Because it was the intention of the study to leave it the teacher to decide how the books would be used and how often, the researchers were dependent upon the participant. To enforce any guidelines or specific activities would be contradictory to the aims of the study. Although we attempted to refrain from offering any advice as to how the books should be used, we did offer technical advice when requested.

In the case of student confusion, thought was given to the position of the researchers. The researchers were introduced to the students as persons who were there to watch and learn about how they learn. Two points are important here. First, most of the primary data were gathered by one researcher, Jillian DeJean. In spite of her intentions, the children quickly promoted her to the role of teacher, and treated her as such. Because of previous experience (Blackstock & Miller, (1989); Olson & Miller, 1994) we were aware that neither teachers nor children view researchers as neutral observers. Indeed, much of the current research implies this mantle is false even when desired (Clandinin, 1986; Bloome, 1994)). In Jill's case the children came to her for help in all subjects as well as counselling. Thus, while we attempted to capture the classroom from afar, it was clear we were intimately a part of it. However, and perhaps unfortunately, the exact dimension of our role is unclear. On the one hand, as will be seen in the next section, we wished to describe the thoughts and actions of the teacher; on the other hand, it became clear we were not neutral observers as we played a role in the classroom.

Data Analysis

Because data from this study were dependent upon the participant and how she integrated CD-ROM storybooks into her curriculum, it was not appropriate to select any predetermined codes or categories for data analysis. Therefore, the researchers did not impose any fixed codes for analyzing the data gathered. It became evident, as the study progressed, that patterns of use, effect, and attitude did emerge. This section of our paper will describe and analyze data based on patterns and themes that emerged from information

gathered through observation of teacher and students, and from both the formal and impromptu interviews with the participant and the student participants (Schumacher & McMillan, 1993).

The process of forming categories for organizing the data gathered represented a *combination* of what Schumacher and McMillan (1993) refer to as emic categories and etic categories. That is, while it was the researchers' intention to develop emic categories, which represent how the participant viewed the data in her language, it was recognized that it is inevitable that the researchers will sort and qualify data according to their own points of view and their interpretation of the information. Therefore, the researchers used emic categories as the principal means of organizing the data while creating their own categories as necessary. The main point, however, is that the data were organized as much as possible through the teacher's perspective.

ANALYSIS OF DATA

After four consecutive months in the classroom, the data gathered from the research site were abundant. Upon consideration of the data, we noted consistent patterns pertaining to Jacqueline's (All names used in this study are pseudonyms.) and the children's use of the CD-ROM books in the classroom. These patterns were organized into four categories, which qualified the information, and while these categories do not exhaust potential topics they represent dominant themes in our analysis. Each category describes the role and the effect of the books as a result of their incorporation by Jacqueline into her elementary classroom. The categories represent a combination of Jacqueline's ideas and points of view as to how the CD-ROM books should have been incorporated into her classroom and our opinions and observations, as researchers, as to how the books were incorporated and their effects on the classroom.

The four categories were: the suitability of CD-ROM books in the language arts and thematic units based curriculum, the teacher's best intentions, CD-ROM books as personality, and the children's use of the books in terms of cooperation versus competition.

The Suitability of CD-ROM Books in the Language Arts and Thematic Units Based Curriculum

The notion of computers serving as an integral aspect of the curriculum is not new; however, some educators see technology driving curriculum rather than serving to enhance it (Fullan, Miles, & Anderson, 1988; Moursund, 1991; Ray, 1992). Because of our interest in this topic, we paid special attention to how the teacher treated the CD-ROM talking books, especially when compared to her normal use of hard covered books. We were equally interested in how she followed up children's reading of CD-ROM talking books. Again, our prime interest was to compare her follow-up to usual practices. As a result of our observations of Ms. Jacqueline Stedmend (All names in this study are pseudonyms.) and the children in her classroom, three subtopics emerged as important. First, it was interesting to note how Jacqueline treated and introduced the CD-ROM books. Second, the congruencies and incongruencies, in comparison with her normal routines and activities, were instructive. Finally, building on the second subtopic, we examined the issue of skill instruction within her language arts curriculum. Specifically, we noted the 'fit' of the CD-ROM storybooks with her usual techniques and materials.

The Role of CD-ROM Talking Books.

Jacqueline's classroom was a "book rich" environment. Within this classroom, there was an emphasis throughout subjects on books. Books were used as tools to introduce themes, served as mainstays of homework, provided links with parents, served as entertainment, and they offered a foundation for the development and assessment of desired reading skills. They even served as time fillers, in the best sense of the term. As time fillers, for example, Jacqueline stressed that upon the completion of seatwork, time could be passed constructively by reading one of the books from the classroom library. Importantly, her students were reminded that they were welcome to take books home from any of the several book repositories in the classroom. At times, Jacqueline even told students to find a book if she spotted them wandering without task or direction. In addition, parents were often brought into Jacqueline's classroom for discussions of students' book reading habits, or lack thereof. She frequently sent notes home to parents urging that the emphasis of homework was to lie less with pencil and paper tasks and more with

independent and parent-child reading. This emphasis can be seen through the following quote by Jacqueline on the role of storybooks where she stated, "... [books] are something they can take home with them and [the students] can show their parents and they can read with their parents, and that's something I really, really try to stress a lot with these kids and the parents..."

Within Jacqueline's classroom, books held power and territory. They occupied almost each corner of the classroom as well as every wall. A large box, crammed with picture books of various titles, lay under one of the work tables in the classroom. Also, different books were contained on a small shelf behind Jacqueline's desk and on a separate shelf near one window. Most interestingly, both chalk ledges were lined with books that were mostly related to current theme work. As Jacqueline tended to not use the chalkboards, her chalk ledges were filled with books on display rather than chalk and erasers. Each day, books were read aloud by the teacher and independently by students as well as between students and between student and teacher in subjects including religion, social studies, science, family life, arts and crafts, and language arts. Therefore, the use of books was prominent in Jacqueline's classroom, much more so than any other learning and teaching tool.

It was within this established context that Jacqueline determined the use of the CD-ROM talking books. As a result of her planning and thinking about their use, she introduced the CD-ROM books as new additions to the established classroom library that were meant to be discovered. Such a use appeared to be congruent with her normal practice of surrounding the children with literature. However, instead of treating the talking books as a distinct type of literature she tied them to a more traditional form--the hard covered storybook.

Before allowing pairs of students to read a particular CD-ROM book, Jacqueline habitually presented its counterpart hard cover version by reading it aloud to the entire class. After establishing the connection between the hard cover picture version of the book and the software program through reading aloud, Jacqueline placed the hard cover version of the book on the chalk ledge located at the front of the class and announced that this book had now become part of the classroom library and that the hard cover version could be taken home at any time. It should be noted here that Jacqueline made an initial and specific request for the hard cover version of each CD-ROM program that was given to her for the study, citing that she wanted the students to be

able to take the hard cover version of the CD-ROM book home at the end of the day to continue the reading with parents.

Generally, comparisons can be drawn between the CD-ROM books and the role of books in Jacqueline's classroom. According to Jacqueline, the CD-ROM books were ideal for her classroom as they mirrored the types of books normally used by her students for independent reading and reading with parents or partners. Specifically, because the books used in the CD-ROM programs were, for the most part, picture books written by familiar authors, Jacqueline noted an "easy transition" for her students from reading the hard cover books of the classroom library to those on the CD-ROM. Authors such as Robert Munsch and Mercer Mayer, who were greatly represented in both the *Living Books* and the *Discis* narratives, were familiar and favoured authors of her students. Indeed, Jacqueline stated that one of the main reasons the CD-ROM books were suitable for her curriculum was their familiar subject matter and consistency with books used by her on a regular basis.

Initially, Jacqueline viewed the *Living Books* and the *Discis* narratives differently. While they were both similar in format, Jacqueline described the *Living Books* as being more simplistic in vocabulary than the *Discis* storybooks and, therefore, she considered them more appropriate for the lower reading levels of many of her students. While the *Discis* storybooks were similar in format to the *Living Books*, Jacqueline saw them as being more challenging to the weaker readers due to a higher instance of difficult vocabulary and larger amounts of print per page. This was especially true with CD-ROM books such as The Tale of Benjamin Bunny and Aesop's Fables, which contained sophisticated vocabulary considering the audience of Grade 3 children.

Living Books and *Discis* narratives were integrated differently from each other, despite their similar formats. The *Living Books* were introduced while the class sat on a carpet and class members laughed frequently as Jacqueline demonstrated the many hotspots that triggered humourous animation. Interestingly enough, they were not treated by Jacqueline as books in the regular curriculum. Rather, they were, ultimately, placed on a shelf in the class and used by students who stayed in at recess, signed up for lunch computer time, or who were waiting for their buses after school. While they became the books of choice by students, Jacqueline did not integrate them into the daily reading program, nor did she organize classwide activities around them. We found this lack of use odd considering her views that the *Living*

Books were ideal for the weaker students. As a teacher, Jacqueline described the *Living Books* as entertaining and enjoyable for the students; however, she did not pursue them as what we would term "academic tools". Because she did not make them an integral aspect of her curriculum, the hard cover copies of the books were not taken from the package and displayed on the chalkboard in the same manner as the *Discis Books*; thus, neither the CD-ROM *Living Books* nor the hard covered versions of the stories contained in them were integrated into the classroom library. Rather, as will be described in the next section, it was the *Discis* storybooks that became the new staples of the curriculum reading program.

After observing and reflecting on Jacqueline's use of CD-ROM narrative storybooks in her class, in terms of the types and roles of books in the class, we noted an important aspect with which the CD-ROM books could be considered apropos with her curriculum. As a rule, we noted that Jacqueline was constantly reading and presenting different types of books to her class. Not only was she reading aloud to the students at least once or twice daily, she was reading and exhibiting many different types of books to them. This literature included poetry books, picture books, non-narratives, chapter books, big books, and reference books such as encyclopedia. She also made an effort to introduce the children to books from different cultures and countries. Students were encouraged on their free time to partake in the variety of books that circled the classroom. If the students were not reading or listening to a new kind of book, they might be constructing one as a classwide exercise. The important point to note here is that the students were constantly exposed to a variety of types of books and the CD-ROM books could be considered one type of that variety. For example, in describing the *Living Books*, Jacqueline stated that they resembled the pop-up "play books" used often in her class. Indeed, such a comparison can be made with Truett (1993), who states that CD-ROM books containing animation reminded her of interactive "toy" books (p.21). In this role, it can be noted that the *Living Books* might have been considered a complement or an addition to the collection of pop-up and activity books that she sometimes presented to the class, but she did not use within the independent reading program.

Only Discis Knowledge Research produced non-narrative CD-ROM books. These *Discis* non-narratives, containing subjects such as spiders, whales, the properties of air, and farm animals, were used to create a new

learning centre. Learning centres were a common tool for instruction in this classroom. Other centres focused on independent mathematics activities, language arts, listening activities, dramatic play, and computers. Many of the centres changed as new themes and subject focuses were introduced. If a thematic unit was being carried out, non-narrative CD-ROM books that contained topics related to the theme formed an information centre where students were to read the book and answer follow-up sheets designed by Jacqueline. Due to what Jacqueline termed, "a more science-oriented" nature of the non-narratives, these books supplied the scientific information for the centres. For example, the *Discis* versions of What Air Can Do and A Tree Through the Seasons were used consecutively as informational centres during a theme on weather.

Reading Routines.

Within Jacqueline's curriculum, reading played a major role. In discussing the role of reading, she stated that she stressed reading as a major skill and habit to be taught by the teacher and acquired by the students. As she put it, "reading is part of everything [the students] do in the classroom". In other words, Jacqueline advocated and organized a "reading across the curriculum" approach, where each subject involved reading in some form. For example, she provided many math problems that required reading in the centre folder marked "MATH". Even the computer programs that were used regularly in class were often focused around reading. In terms of skill development, students were encouraged to "...read for themselves" by looking up words in a thesaurus and dictionary.

Several regular activities comprised the reading program. Principally, each afternoon, a period was set aside specifically for reading. Within this context, the students used *The Scholastic Three I's* program, an independent reading package requiring students to read a book of their choice and of a reading level designated by Jacqueline. Follow up question cards of primarily fact-based questions accompanied each book. Students worked with a particular book until the related questions were answered and the child's understanding of the book met Jacqueline's expectations. The main point to be stressed is that this was an independent reading program, where each student read books and answered questions individually. The books contained in this program ranged from picture books such as the "Jillian Jiggs" series to

more difficult chapter books. If Jacqueline found a student to be reading a book that was too difficult or too facile, she would recommend one more suitable.

Jacqueline held regular reading conferences with students, which she used to assess reading progress and teach skills. Conferences were conducted primarily on a voluntary basis unless Jacqueline felt the need to meet with a student to complete her records of that student's reading abilities. Within the conferences, students read aloud to Jacqueline while she took notes on such skills as fluency, word attack, and expression. Comprehension was assessed through discussion of the story and questions. These notes were used for report cards and for parent-teacher conferences.

Another important reading activity was what Jacqueline termed "novel studies". This activity required the students to read together in groups on a specific novel. Groups were formed by Jacqueline according to reading skill level. Specifically, the class was divided into three groups: advanced, intermediate, and weaker readers. Members of each group worked on a book considered suitable for their abilities. For example, the advanced group worked on the Jurassic Park chapter book while the weaker group worked on a picture book that contained little text amongst large illustrations. Procedures for reading were established by Jacqueline and each student had the opportunity to read aloud to the rest of the group.

A final and crucial element of Jacqueline's reading program was reading aloud. Specifically, much emphasis was placed on reading aloud within the classroom. Each day, Jacqueline read aloud either a chapter from an on-going theme-related novel or from a different type of shorter book. The class convened on the carpet at the front of the room and listened to the teacher read aloud. Reading aloud, according to Jacqueline was a favourite and important activity of her reading program. She stated that the students "loved being read aloud to". If it was not Jacqueline reading aloud to the students, it was students reading aloud to each other. For example, Tamara, an advanced reader and writer, often read aloud plays to the class that she wrote. In addition, students such as Sonya and Miriam often shared compositions they had written.

The *Discis* storybooks were integrated into the reading program as books used for the independent reading. Because the emphasis in this classroom was on individualization and independence, Jacqueline immediately noted a role for

the books in the program. Jacqueline placed an emphasis on individual skill building and response to the reading; thus, she perceived the CD-ROM storybooks, with their many assistance features, as complementary to her teaching style. She believed that students could read independently within the CD-ROM environment, just as they had been doing within the *Three I's* program. Also, because many of the books used in the *Scholastic* program were picture books, Jacqueline saw an equivalent between the formats and subjects of *Discis* narratives and many books from the established program. Therefore, the CD-ROM books were integrated into the existing program in a natural manner. During each reading period, two different pairs of students read from a choice of *Discis* storybooks and then answered follow up sheets that were provided by the publishers. Almost every week, Jacqueline would introduce a new *Discis* book to the students and each new book was placed on a pile beside the computers. The hard cover versions of these CD-ROM books were immediately placed on the chalk ledge for students' perusal and to help them complete the follow up activities. which were completed as seat work.

Jacqueline was pleased with the large variety of CD-ROM books given to her because they allowed for the choice of books that the students had grown accustomed to within the *Three I*'s program. In explaining her use of each of the *Discis* storybooks, Jacqueline mentioned that the subjects of the books did not have to be relevant to any particular theme, topic, or reading level. Just as with the existing *Three I's* program they simply had to provide the option of choice.

Overall, Jacqueline believed the CD-ROM storybooks could play a role in her reading program, and her initial actions supported her contentions. She assumed the classroom should contain a rich repository for children's literature of all types, and the CD-ROM talking books were, for the most part, treated as another type of literature. Because of her belief, Jacqueline introduced the CD-ROM storybooks as equal partners to the hard-covered books. She also believed that the activities accompanying the books, especially the *Discis Books*, were congruent with her normal routines and activities; thus, she willingly adopted them as a follow up to the book reading. Each of these aspects of her use shows strong congruency between existing routines, materials, and activities and the CD-ROM talking books. However, there were some elements of her use that were problematic.

As stated earlier, *Living Books* were not included into the independent reading period for reasons unexplained by Jacqueline. It may be that she questioned the academic value of the books due to the emphasis placed by both the publishing company and the students on the animated hotspots. This is not to suggest that entertainment and reading for learning should be considered mutually exclusive, but in the face of the highly amusing animation, little emphasis was placed on the textual value of the *Living Books* by students or teacher. Although students favoured "reading" within the *Living Books* environment, it became apparent that Jacqueline did not deem them apt as additions to her independent reading program even though she admitted that they might have sparked an interest in literature through entertainment and that they may have been easier to read for the weaker or less motivated readers. We base this judgment on the fact that after using Harry and the Haunted House for a brief period at Halloween, the *Living Books* were no longer used within the daily curriculum. As a result, the *Discis* narratives, with an emphasis on follow up activities and immediate academic support through assistance features, were adopted as the more appropriate reading tools.

At this stage of the study, the following situation had evolved. The teacher saw the *Discis Books* as sound tools for teaching and learning, and this particular type of technology constituted her main use of the multimedia software. As we observed, Jacqueline attempted to integrate the *Discis Books* into her normal curriculum by treating them much as she did books from the *Three I's* program. However, the children, when given the chance, preferred the *Living Books*, and during computer free time (e.g., recess) they invariably gravitated to them. It was at this stage of the study that we turned our attention to the students, and how they used the books.

With regard to the *Living Books*, we are not certain one can term what we observed as reading. The software required the reader to listen to each page being read aloud while the text was highlighted. However, while this was occurring, the children typically would chat, look out the window, or play with the mouse. As soon as the page was read, they would take turns clicking on hot spots to see the animation. Their comments indicated glee at the activity on the screen, and some would return to the same book again and again. If an adult was near a common comment heard was, "Just watch this!" The children were aware of each of the hot spots, but clicking them repeatedly did not seem

to create boredom. It may be that the children were learning in an incidental manner (See Blackstock and Miller (1989/90) for an example of how such learning can take place in a computer environment.). However, we have no direct evidence of such learning or its nature.

It is also interesting to note how the children used the *Discis Books*. At the beginning of the term the teacher created a special lesson where the children were taught how to use the assistance features. These features are the ones that permit the children to read independently so their use was stressed. Children were taught to click, double click and press and hold the mouse depending on which assistance features they wanted to access. For example, a single click might access the word's pronunciation while a double click would give both the pronunciation and meaning. A large chart containing these directions was placed on the chalkboard. Interestingly, even though Jacqueline initially stressed the use of the assistance features, the children tended to select only the read aloud feature. It was impossible for Jacqueline to oversee how the children were using the features at all times, and she eventually stopped giving them specific directions as to how to read the books

The read aloud mode thus became the format of choice, and because the students listened to the story they were able to complete the follow-up activities. According to Jacqueline, this was an important feature for the students, and the children's frequent access of the read aloud option did not surprise her. As stated earlier, Jacqueline believed that her students loved to hear books read aloud, and because the CD-ROM books provided a human voice, the children were having this need fulfilled. Therefore, in this area, she saw these books as fitting the curriculum.

Summary. At the beginning of the study Jacqueline believed that the CD-ROM talking books could play a positive role in her overall language arts program. In a literature rich classroom, she set out to make them another tool for fostering literacy. Her practices using the CD-ROM books did mirror many of her traditional routines and techniques. Although not always stated, Jacqueline did appear to make conscious choices about which books she would use for what purposes. Further, recognizing the potential of some of the assistance attributes of the CD-ROM talking books, she attempted to teach the children to use them in a beneficial manner. In many instances, her goals were achieved. However, while the teacher saw the books from one perspective,

the children may not have viewed them in the same manner. Especially in the case of the *Living Books*, the children tended to see them more as entertainment rather than as tool in learning to read. Of course, making such a statement does not deny the value of seeing reading as enjoyable. We simply question the difference between the type of enjoyment the children were demonstrating and that one may experience when 'lost in a book'.

Language Arts Skills.

As a teacher of third grade students that were early into their year, Jacqueline placed emphasis on developing key skills in the subject of language arts. Through normal activities such as explicit spelling and phonics instruction, weekly spelling tests, and sentence and composition writing, the students worked on the language arts skills that Jacqueline deemed vital. In addition to explicit language arts instruction, the students worked on their skills independently during centre period, where various activities including word searches, sentence construction, word descrambling, and rhyming words were related to the current theme. Jacqueline worked consistently to help students develop their abilities to write complete sentences and to use descriptive words. Also, Jacqueline emphasized students' comprehension abilities such as reading for detail.

As a result of this emphasis, assignments and activities were organized to help students acquire language arts skills such as the ones described above. Follow up activities to the *Scholastic Three I*'s reading program focused primarily on asking factual questions that would help students develop their abilities to read the text and focus on the details within a story. When students turned in written assignments, marks and comments would be based on whether students used proper punctuation and description in their sentences, and whether written sentences were complete. Each time the class was introduced to a new list of spelling words, they often worked on sounding them out and clapping the words according to the syllables. Jacqueline followed up her skill instruction even outside of explicit language arts instruction; thus, any time a student needed help in pronunciation, a student might be asked to clap out the syllables. Language arts comments on student report cards focused on the skills taught during the evaluation period, and there was, indeed, a consistent emphasis on these skills within this classroom.

The features of the CD-ROM books and the accompanying follow up activities appear to have both enhanced and reorganized Jacqueline's existing language arts curriculum. Particularly, in regard to the *Discis* narratives and non-narratives, which contained features that allowed students to have words pronounced, defined, and enunciated in syllables, the CD-ROM books complemented a curriculum that focused on such skills. When the children used regular hard covered books, Jacqueline constantly required students to search for the spelling and definitions of words in dictionaries and, as stated above, they clapped out syllables regularly. Jacqueline embraced these technological features into her classroom by linking the attributes of the CD-ROM books to her spelling and phonic lessons. For example, when explaining a spelling exercise to the class that required students to seek the definitions of certain spelling words, Jacqueline compared the exercise to seeking out a definition in the CD-ROM environment by stating that it was the same in the *Discis* books, where students could click to find the meaning of a word. In addition, when first introducing the students to the features of the books, Jacqueline compared the syllabification feature of the CD-ROM books to their clapping activity. These features, therefore, can be judged to have been congruent with those skills emphasized by Jacqueline. In essence, just as definitions, syllabification, and pronunciation were a priority with Jacqueline, they were also a priority within the CD-ROM software.

By contrast, a more complex discussion arises when considering the suitability of the activities used by Jacqueline to follow up work on the CD-ROM books. As mentioned above, the majority of follow up questions to reading given by Jacqueline and supplied in the independent reading program were factual in that students were required to find the answer to a question within the text they had just read. Such follow up activities characterized the *Three I's* program, the novel studies work, theme research projects, and Jacqueline's questions during reading questions. In explanation, Jacqueline noted that she placed constant emphasis on the students being able to read for detail. Therefore, factual based inquiry characterized the majority of the student work. This emphasis was true in relation to both reading and writing activities, where students were required to give factual answers in response to text or to provide facts in research projects. It is important to note is that students were rarely given questions that required them to think abstractly or go beyond the text. An example of a common question from the *Scholastic*

Three I's program was the following: "How did the farmer show he had learned his lesson?" Another example may be seen in a writing project on dinosaurs where students were required to provide the following information: meaning of name, length, height, diet, and era of existence, Such an emphasis required the students to read for facts, and this emphasis was valid whether they were using hard cover non-narratives or the related CD-ROM non-narrative book entitled Dinosaurs.

Interestingly enough, the follow up activities accompanying the *Discis* narrative books frequently presented a different focus. For example, readers were asked to describe and list attributes of story characters, place events in chronological order, draw pictures relating to events in the story, and find synonyms of difficult words in a thesaurus. While it would be incorrect to contend that Jacqueline never focussed on activities that required the reader to 'go beyond the text', they were not the dominant focus in the normal curriculum. However, she embraced these follow up activities and used them regularly. Moreover, she evaluated them in much the same manner as the traditional follow up activities. Such activities provided a new dimension to the reading program and a new way of envisioning text for readers who were used to reading a text for the purpose of finding specific information. This adoption of the Discis follow up activities, with their emphasis on higher level thinking and reasoning about the story is instructive as it represents what many educators would see as an example of technology leading teachers into productive new areas of learning. While this observation may be valid, it should also be noted that this new direction extended only to the follow up activities used with the *Discis Books*. As will be seen, a different pattern of use was seen with non-narratives, where no follow up activities were provided by the software publisher.

A few of the skills represented in the *Discis* follow up activities were congruent with the normal type used by Jacqueline with hard covered books. Thus, children were familiar with techniques for completing them. It is the new skills and reading activities that most intrigued us. It is not enough to simply observe that the students were led in promising new directions by the activity sheets, and that they had to develop higher level thinking skills to deal with them. Because of their unfamiliarity with these new types of questions and activities, students had to be taught certain concepts to complete the sheets. For example, while the class had learned about opposites, they had

not yet learned about homonyms and this skill had to be taught by Jacqueline in small conferences. Also, while students had learned about different kinds of poems, they had not learned about Cinquain poems, a dominant form in one of the CD-ROM talking books. The students had to be taught how to construct one, and only those who read Scary Poems for Rotten Kids learned how to write one. Ultimately, some students had difficulties completing the sheets and sought constant aid from the researcher and Jacqueline.

The new directions the *Discis Books* led to are fascinating, especially in terms of the comments made by computer 'gurus' who see technology driving curriculum. Indeed, technology may lead a teacher to focus on new skills and to modify the curriculum (Miller, 1989). However, there is nothing to prove that all changes are necessary good. Equally important, even when teachers do modify the curriculum the changes involve costs in terms of time and teaching strategies. Jacqueline's children had to be taught how to deal with these unfamiliar types of questions and activity formats, and at least initially, this format change was disruptive. It is true that the students might not have learned these new skills or been required to use higher level thinking if these concepts had not been embedded in the follow up activities for the CD-ROM books.

To determine the overall impact of the different activities contained in the *Discis* narratives, it is instructive to examine Jacqueline's development of her own follow up sheets for the *Discis* non-narratives, which were used most frequently as a part of thematic study. As mentioned above the *Discis* non-narratives were not accompanied by reproducible follow up sheets. Therefore, Jacqueline constructed her own questions and format. Intriguingly, she reverted to her normal style of questioning in that they were entirely factual in nature.

Summary. Jacqueline clearly saw the CD-ROM narrative and non-narrative books as fitting into her normal curriculum, and many of her uses support this contention. Books were a crucial element in her overall curriculum, and the CD-ROM books were treated as equal partners to the existing hard covered books. However. Jacqueline was aware of the special assistance features available in the software, and she attempted to exploit these attributes. Because follow up comprehension activities and skill development were a

natural part of her normal pattern of language arts instruction, the CD-ROM follow up activities were seen positively for their goodness of fit.

There were trade-offs in her use of multimedia technology in that the CD-ROM books sometimes stressed skills and comprehension activities different from those normally emphasized in the classroom. Because of this incongruity additional time had to be devoted to introducing these new skills and activities. Another trade off occurred in the manner in which children and the teacher viewed the books. The teacher saw the CD-ROM books as serious tools of learning, and her exclusion of the *Living Books* into the normal curriculum demonstrated her negative view of a series that stressed animation to the detriment of text. However, the children gravitated readily to the highly animated series, even if they did not seem to read them in a traditional sense

The Teacher's Best Intentions

Part of the data gathering process was to interview the teacher prior to implementation about her goals and intentions in using the CD-ROM talking books. This interview concerning her intentions was carried out only after she had been instructed in their use and given time to think about possible applications. As a well-respected teacher, Jacqueline was confident about her curriculum; moreover, she was an established user of technology as seen by the three existing Apple GS and Apple II computers in her classroom. Thus, in our interview Jacqueline expressed optimism about the value of the technology and the impact it would have on the children. Her enthusiasm provided us with a second analysis category as we wanted to compare these initial ideas with practicality. While Jacqueline had many ideas for the use of the CD-ROM books in her class when she was first introduced to them, several ideas were not realized. Such a trend was so consistent and dominant that a category was organized around it. Our aim in analyzing realized and unrealized goals was not to 'beat up on the teacher'; rather, we were interested in the conditions that facilitate or inhibit a teacher's use of technology. Boag and Massey(1981) established in their study that while teachers can feel initially excited about a new multimedia technology and become immediately enthusiastic about it, enthusiasm might wane after teachers begin to attempt to incorporate the technology into the classroom environment. For different reasons, we think Jacqueline demonstrated this pattern of behaviour with her own use of the books.

After viewing the *Discis* narratives both with the researchers and independently, Jacqueline was immediately impressed with the recall feature. The recall feature kept a record of every word a child accessed while reading a story. Specifically, she was excited about the prospect of being able to save and print out lists of words with which students had difficulties. With the exception of the weak readers in her class who, she anticipated, would click on many words, she saw the recall list as an opportunity to keep close tabs on readers' difficulties and growth. Initially, she planned to construct different vocabulary flash cards from each student's recall list for follow up drill. In addition, she planned to include the lists in students' reading folders that were to be sent home for practice with parents. Talk of spelling lists and tests based on common recall words also arose.

This initial excitement did not translate into practice as the recall lists were only saved after the first book, Scary Poems for Rotten Kids, was introduced. What could account for this rapid departure from the original plan? First, the recall list is readily available as the computer does all the work; however, it is the teacher who must print the list, and because the Macintosh LC computers were not linked directly to the printer, time and effort were required to produce the necessary lists. Second, the recall list is only useful if something is done with it. The type of instruction Jacqueline planned takes time and effort. Jacqueline's classroom is busy not only with learning, but with all the other activity that characterize the real world of schools: meetings with parents, collecting pizza money, planning the school musical, and stopping instruction to listening to intercom announcements. To fully realize the usefulness of the recall list, Jacqueline might be required to abandon another activity that may have been equally useful, or she would have to stay longer after school to extract the words from the list and create the flashcards.

In the initial interview Jacqueline was so excited about the subjects of the *Discis* storybooks that she listed all the themes where she might use them. She talked about organizing a unit about fairy tales within the first month so that she could incorporate Cinderella and The Paper Bag Princess into theme work. She also planned to organize a unit about fables using the *Discis* book Aesop's Fables as the main resource. We found these plans odd because she was, originally, confident as to how the *Discis* narratives would fit into her regular curriculum as student selected options for an independent reading

program, not in relation to theme work. Nevertheless, she was eager to organize and introduce new themes into her curriculum for the purposes of integrating the relevant *Discis* titles. However, despite her original goals, the themes did not materialize.

Although these plans to use the technology as part of theme study were not realized, they seemed to contradict her contention that the CD-ROM talking books fit best into her normal reading curriculum with its format of choice and self-selection. Perhaps she saw special value in the follow up activities provided by the publisher, and indeed she remarked about how well these activities were constructed. Equally important, the follow up activities were in the form of reproducible masters, thus presenting an ease of introduction. It also must be remembered that theme work was a common instructional form in Jacqueline's class so the modification of her original plan may not be as unusual as first seen.

One of Jacqueline's intentions concerned the various font and print styles available to the reader. She thought these features might be especially amenable to the emergent and weaker readers who seemed most comfortable with books that contained few words per page and large print, Jacqueline saw the adjustable font and line spacing as important for those students reading the *Discis* storybooks. While both the *Living Books* and the non-narratives had few words per page, the narratives mirrored their hard cover counterparts; therefore, at times, there were many words on a page, with single line spacing. Equally important, Jacqueline thought that the different assistance features might benefit children in different ways. Jacqueline noted those students who would benefit from the alterations, and then planned to show them how to make necessary adjustments as desired.

Like several other instances involving the features, Jacqueline did not follow through with these plans. Rather, she introduced the class to the same access routines -- click for pronunciation, double click for syllabification, press and hold for definitions -- without stressing those features that might have helped certain students. Even though she initially recognized the advantages of these multiple assistance features, she did not follow through on the plan. As mentioned previously, the children tended to gravitate toward one feature, having the book read aloud. While their knowledge of the story was good, as can be seen by their performance on the follow up sheets, the original plan to individualize instruction through the assistance features was abandoned.

Summary. Jacqueline's original plans and subsequent action were both consistent and inconsistent. What must be considered here is Jacqueline's reasoning behind the lack of follow through and fulfillment as well as the instances when her plans were realized. While it is easy to become excited about a colourful, musical, and possibly helpful new technology, it is not as easy to integrate it into the classroom. Because one of the purposes of this study was to examine how CD-ROM books fit into one classroom, difficulties must be noted. Overwhelmingly, Jacqueline noted time as the main reason for her lack of follow through. In other words, as a busy third grade teacher, Jacqueline did not find the time to organize new units or to construct individual flash cards. Time also may have been a factor in terms of her follow up of the assistance features.

In a study related to this one, Miller, DeJean, & Olson (in progress) found that even with constant reminding children tended to neglect to use all the available assistance features, and Reinking and Rickman (1990) found that even older readers did not access all available help. As adults, we might think that using all the available assistance features in a computer program is natural, simply given their existence. However, consider the available options on a word processing package. How many features, for example macro strokes, section reformatting, and framing, does the average user access in any given session, even when they obviously would enhance the composing process? The teacher's best intention was to teach the children how to use many of the available help features; however, with her busy schedule and the children's propensity to not use the features, the goal was not realized.

Some of the teachers best intentions were realized, and the implementation should be recognized. For example, Jacqueline planned to use the books in a manner similar to her use of hard covered books, and this goal was achieved. Jacqueline's children read a great deal, and a plethora of books is crucial to her techniques for fostering literacy. In this sense, the books added, in their unique way, to her classroom library. Jacqueline also was impressed with the follow up activities provided by the publisher of *Discis Books*, and she believed these activities would be useful in fostering literacy. We made no attempt in this study to measure reading achievement, but clearly Jacqueline did follow through with her intentions by making them the follow up activity of choice after the reading of the CD-ROM books.

One can be critical of some of Jacqueline's implementation intentions, such as the manner in which she constructed follow up activities for the non-narrative CD-ROM books, although it is instructive to note that she was able to find a place for them in her curriculum. However, she developed the follow up activities in a manner consistent with those used with traditional media. Such traditional use of CD-ROM technology is an anathema to those educators who see multimedia as fostering new ways of thinking and processing information. However, as frequently is seen with predictions about technology, dreams may not equal reality.

It is important to note that the practicalities of the classroom must be considered in any discussion of the suitability of new software for that classroom. Compared to the Boag and Massey study (1981), where teachers failed to embrace a new multimedia technology due to its incompatibility with their existing curriculums, CD-ROM books, with their myriad possibilities, seemed to offer a natural fit with Jacqueline's normal routines and curriculum. However, to capitalize on the immense number of options and opportunities presented by multimedia technology, much time, effort, and knowledge about the software were required. As a result, the talking books presented themselves as a challenge to Jacqueline's daily routines and teaching methods. Rather than criticize Jacqueline for her lack of follow through with her intentions, this paper considers the reality of how one incorporates technology into the existing curriculum. The ideas that Jacqueline proposed may have been more far reaching than could be achieved in such a short time frame. Further, they may have been brought on by initial enthusiasm. Perhaps Jacqueline was not prepared for the immense amount of planning, monitoring, repairing, and explaining the CD-ROM books required for full implementation and use.

It must be remembered that while Jacqueline was taught how to use the books, she began implementation almost immediately. Moreover, her training was technical in that she was taught about the features of the books, not how they should be used. Perhaps it is naive of both educators and publishers to assume that teachers will use technology in the manner intended, especially in the short term. Indeed, in this study there is some implied criticism of her use of the technology. Jacqueline may dispute this notion, believing the books were used exactly as she wanted to them to be used. This study will be replicated next year, and Jacqueline will taking one of the computers home this summer to examine further the software and think about its use. It will

be fascinating to compare her use of the technology in this study with future applications.

CD-ROM Books as Personality

Jacqueline was chosen for this study because she was a confident, self-assured teacher who had several years of experience. Indeed, when we first met her, she had definite plans as to how she was going to incorporate the CD-ROM books into her curriculum. While she did not go into specifics, she was certain as to what subjects and contexts would most benefit from the books. She explained that she saw the books as enrichment tools, suitable for enhancing her reading program and her learning centres. What is most important to our next discussion was Jacqueline's position that the books would not be used in inappropriate situations or those that would not enhance learning (Hickey, 1993). In fact, when discussing whether the books would be difficult to integrate, she stated firmly that the books would not be used if they did not fit in with what she was doing and that she felt no pressure to use them superfluously.

Contrary to the above point, a pattern emerged from Jacqueline's use of the CD-ROM books. Given the comments noted above, she began to use the books in what we judged to be inappropriate contexts. As a result of this observation, the category of CD-ROM as Personality was established to contemplate whether the books emerged as more than mere teaching tools and whether Jacqueline allowed them to take on personalities and voices of their own. While this category is not representative of Jacqueline's point of view, it does consider the effect of CD-ROM books within the classroom atmosphere and, as stated initially, we planned to make our own observations about how the technology was used.

One example of how the computer technology claimed ownership over the curriculum may be seen in November, when a teacher from Zambia visited Jacqueline's classroom to talk about school systems in Africa. To prepare for the visit, Jacqueline had a brainstorming session with the students on the carpet, and she asked them to devise questions they wanted to ask the teacher. In addition, students looked up Zambia in a large atlas and talked about characteristics of Africa and aspects of African life as a class. Peculiarly, Jacqueline kept two pairs of children on the CD-ROM computer while the discussion was taking place, and the books had nothing to do with the topic.

Therefore, four students did not participate in the brainstorming or the geography discussion because they were reading a *Discis* narrative.

On another occasion, Jacqueline entered the class in a drawing contest sponsored by a popular breakfast cereal. Each student created an illustration and the drawings were submitted as a class. Because this was a classwide activity, Jacqueline put aside an entire period for the students to draw and colour their entries. Students were allowed to talk, listen to music, and compare their work. While the majority of the class was drawing for the contest, four students were placed on the CD-ROM books and told to work on their entries on their own time. We wondered why Jacqueline did not excuse the students working on CD-ROM books to allow them to participate in this activity. The students on the CD-ROM books were still required to read the books, although the remainder of the class was engaged in an unrelated activity.

This pattern of 'the computers must be employed at all costs' was seen in several contexts. In one case, all centre activities, except the CD-ROM centre, were canceled so the children could work on a special project. In another instance, while the class worked on spelling, four students worked on the CD-ROM non-narrative activities at the computer centre. This was a regular occurrence. When other students packed up the centres for the daily spelling lesson, the CD-ROM students were expected to continue in that centre. In particular, it was Jenny who caught our attention. Jenny was described by Jacqueline as a low skilled, almost non-reader. Many of Jenny's reading assignments were altered to meet her skill level. One day, while Jenny was working on a CD-ROM non-narrative entitled A Tree Through the Seasons with Tamara, it was time for spelling instruction. While the rest of the class was receiving spelling and phonics instruction, Jenny continued to work on the CD-ROM book.

One may contend that there is nothing wrong with the children working with the CD-ROM books, even if the rest of the class is engaged in another activity. However, the teacher argued that she would not use the books in inappropriate ways, and that they would not dominate instruction. Perhaps Jacqueline did not view this use as inappropriate, but we saw the CD-ROM books being used as more than mere tools. We think that, as seen through the above examples, Jacqueline allowed these books to take on larger roles. In short, she gave the books more personality within her classroom. We were

puzzled by the contrast between her original self-confidence and by her stated willingness to set the books aside when she wanted the students to work on other projects.

One possible reason for this usurping of power may be attributed to the presence of the researchers. Jacqueline knew the purposes of our study, and she may have felt an obligation to use the technology as often as possible. Also, visitors and other teachers frequently visited the room, and the CD-ROM books became a focus of interest and discussion. Again, when technology is treated in a unique manner and as a special form of teaching and learning, it may take on power and personality not intended originally. From the beginning through to the end of the study, Jacqueline frequently informed us when she would not be using the books. In this manner, she felt that we would not have to 'waste our time' observing her when the technology was not being used. She cited reasons such as catch-up work, desk cleaning, and art classes. Therefore, we found it all the more strange that she continued with the books during the events mentioned above. We judged that she never had any difficulty letting us know when she would not be using the books. Yet, she appeared, in some instances, to be acquiescing herself and her routines to the technology.

Jacqueline stressed that she wanted the students to have as much opportunity to experience the books as possible within the time frame of the study. This was the reason she gave for grouping students to read within the books and, perhaps, was one of the reasons she was adamant that students read the books as much as possible. However, such activity still suggests a role given to the books that was not given to other tools for fostering literacy and learning. Several unique activities arose during the study, some of which were mentioned earlier in this section. Yet, some students missed them because they were reading the CD-ROM books.

To consider this issue further, it is possible that a discrepancy in perception added to this phenomenon. Jacqueline was trying to arrange for as many students as possible to read the books because she saw an enthusiasm for these books that could not be paralleled by any other activity or resource. She told us, frequently, how excited the students were about the books and, therefore, might have thought she was doing the children an injustice by interfering in their times to read them. Interesting enough, this accommodation of students' enthusiasm may have had an undesired effect.

While students remained enthusiastic about the prospect of "playing" with the *Living Books*, they gradually lost interest in reading the *Discis* narratives and non-narratives, claiming that they could not be played with and that they were not as much fun. In other words, while Jacqueline was attempting to please the students by providing as many experiences as possible for them to read the *Discis* books, the students' enthusiasm for the books was waning.

Summary. Technology has the potential to become an icon in its own right, to take on power it rightfully should not possess. In this study, as with others (Olson, 1984, 1988) certain powers were given to the computer that were not ascribed to other teaching tools. Jacqueline made decisions to use the CD-ROM books during classwide activities that appeared to have little to do with the content of the books. As mentioned previously, she may have felt pressure to perform for the researchers, or she may have wanted to accommodate the enthusiasm of the children for the technology. We do not contend that this diversion was detrimental to the children or their learning; instead, we simply found that it was contradictory to Jacqueline's original contentions and plans. Also, she did not always permit the computer to truncate the classroom activities. On several occasions she informed the researchers that the children would not be using the CD-ROM because of other needs. Such a mixed picture of use is not disturbing to us as we believe it is more realistic than some of the descriptions of computer use that occur frequently in computer journals, especially those that adopt an advocacy position for technology.

Technology frequently seems to take on an aura that we believe should not be assigned, and our research points to the conclusion that teachers do allow the computer's personality to dictate or modify practice. From our perspective ascribing special status to technology is improper; however, there are many forces that reinforce the notion that technology possesses powers that supersede those of the teacher. One only has to read the books and articles by technology advocates to see where such ideas emanate (e.g., Perlman, 1992; Pappert, 1980). Perhaps it is only when teachers feel as comfortable saying no to technology as saying yes that a productive place for the medium will be found.

Cooperation or Competition?

As with the previous issue, this category discusses the effects of CD-ROM books on the elementary classroom from the researchers' perspective. This category considers how the CD-ROM books, with their myriad features, affected cooperative learning. As stated earlier, the students were paired to read both the *Discis* narratives and non-narratives. Jacqueline's reasoning behind pairing them was to allow the students as many separate opportunities to read the books as possible. Students were paired consciously by Jacqueline according to three methods: low level reader with a higher level reader, friendship, and gender. These three types of groupings were used equally, with Jacqueline changing the pairings with each new book. Approximately mid-way through the study, Jacqueline commented that she was pleased with the pairing formats, and that she expected that the students were working well together. She stated that the students usually worked well as pairs on other activities, and that she had hopes for high levels of interaction and different kinds of learning with the books. Indeed, to support her observations, she stated that she had already noticed good collaboration amongst the pairs.

As we worked with the students, however, we noted consistent patterns of behaviour that were contradictory to Jacqueline's expectations and these contradictions appeared to come about as a direct result of the features of the books. The *Discis* books, with their focus on assistance support and features such as music and sound effects, created problems for the pairs of readers. Almost no two students worked harmoniously, having both of their needs met. What tended to arise, regularly, was a power struggle. There was a struggle for dominion of the mouse, which represented control over the features and, ultimately, over the process of learning. Regardless of the grouping, whether among friends, peers of the same sex, or reading levels, one student tended to command the mouse. For example, within each pairing, there tended to be a leader, or one student that exhibited more aggressive traits. That student usually emerged as the controller of the mouse. For example, because Derrick was a popular student in the class and thus possessed status, he often was given control by his partner. Stronger readers often exhibited more confidence, and, therefore, grabbed the mouse from the weaker, more uncertain readers. Even among friends, those who could move faster, talk louder, or be more insistent tended to gain authority. There were even physical instances that

amounted to minor pushing or tricking to gain (or regain) control of the features of the book. The result of these power struggles was one student whose needs were satisfied and another student whose needs were ignored or satisfied only through serendipity.

Within this context, we saw competition for control rather than cooperation and collaborative learning. This is an issue we found fascinating, considering the effects of the books on the classroom. Where Jacqueline seemed to assume harmony in learning due to past computer-based experiences, we noted a unique situation that was brought about because of the nature of the books. What was happening was, in part, a "clash of personalities". With the presence of two readers, each with his or her needs and preferences, and a computer program with so much to offer, there were too many personalities present. The students began to struggle with each other to have their needs met, page by page, and the CD-ROM books offered so many possibilities that each student had too much to choose from in meeting his or her needs. The possibility of two students wanting the same things was low. For instance, there was a struggle over the sound effects between two students. Because the books offered the possibility of sound effects with page turning, clicking on pictures, and, separately, on sentence speakers, there were numerous possibilities. One student wanted sound effects with every page, while the other found the sound annoying and distracting. In another instance, one advanced reader, who seemed to find the book boring, wanted to click on the pictures to see them labeled and to hear the accompanying sound effects. Unfortunately, his partner wanted to continue with the story and, hence, there was a struggle. Even though Jacqueline predetermined the way the students were to access difficult words, there was invariably one partner who wanted to find out how to turn the sound effects off or one who wanted to click randomly on pictures.

There were instances, however, that demonstrated some hope for cooperative and collaborative learning with the computers. At times, we noticed a stronger student helping a weaker student in the face of a difficult word. For example, Allison, the stronger reader, was helping Paul sound out a difficult word. When Paul could not sound it out, Allison reminded him to click. Unfortunately, such an instance was rare. Also, as the majority of the students opted to have the book read aloud to them before reading it

themselves, there was little effort or struggle to access anything. In other words, when the reading was passive, there was no need for struggle.

Summary. The issue of cooperation versus competition is important when considering how well CD-ROM books can be incorporated into the classroom. Where teachers might be used to pairing students in reading and computer activities, these books are unique in that they were designed for an individual user. There is only one voice of help offered and where students may work well together in a hard cover book atmosphere, difficulties may arise with the narrow access options presented by the CD-ROM books. With so much to offer and only one means of access, the books might bring about competition rather than collaboration with each page.

The finding that children tended to be more competitive rather than cooperative in this environment should not be seen, necessarily, as discouraging. Rather, it simply represents another challenge to those teachers who wish to use new information technology effectively. Patterns of behaviour seen through the lens of the normal curriculum, routines, and teaching techniques may not automatically transfer to seemingly similar situations when technology is used. The children described in this study were neither malicious nor cruel; indeed, our observations of their behaviour generally support the opposite conclusion as they demonstrated kindness and consideration toward each other. However, when software is used in a manner that may contradict its design, in this instance the notion of pairing children when the CD-ROM story books encourage individual control and response, children may react in ways that appear selfish.

Summary

This study described and analyzed the use of CD-ROM talking books in one Grade 3 teacher's classroom over a period of four months. Our goal was to capture the teacher's intentions as to how she planned to use the books as an integral part of her language arts curriculum as well depict how she actually used them. Further, we desired to see their effects on the classroom. In carrying out the investigation we used several data gathering techniques including interviews with the teacher prior to, during, and after the

introduction of the technology. As well, we engaged in intensive observation of the classroom scene.

Our analysis of the data disclosed four categories that were revealing in terms of the teacher's intentions and subsequent use of the CD-ROM talking books. They were: the suitability of the CD-ROM books in the language arts and thematic units based curriculum, the teacher's best intentions, CD-ROM books as personality, and the children's use of the books in terms of cooperation versus competition.

In terms of the suitability of the CD-ROM talking books in the language arts and thematic units based curriculum and the teacher's best intentions we discovered varying patterns of behaviour. There were numerous examples of implementation congruent with the existing curriculum and routines of the classroom. However, there were also examples of use that appeared to be incongruent with normal techniques, patterns of instruction, and classroom routines. When the teacher's best intentions for using the CD-ROM talking books were analyzed, both congruencies and incongruencies were noted.

Two topics emerged from the data that were not seen originally as important: the notion of the CD-ROM as personality and the children's use of the books in terms of cooperation versus competition. The first subject has appeared previously in the literature so perhaps it should not surprise us that computers can take on a role that appears to go beyond their obvious utility (Olson, 1986, 1988; Carbone, 1995). However, the second finding, that children tended to be competitive in controlling how the features of the books would be selected and used, was surprising. In a class where cooperation was the norm, the characteristics of the CD-ROM books seemed to bring out an undesired behavioural element in the children.

Conclusions

How are we to gauge our observations of the teacher's and children's use of the CD-ROM talking books placed in the classroom? A skeptic or pessimist might wish to scourge the teacher for her lack of consistency, inability to follow up her intentions, and unwillingness to see problems with the technology. An advocate of technology might see her actions as ground-breaking, and view her as a leader in the vanguard of educators making technology an important tool in fostering literacy and learning. We find

neither extreme position congruent with our findings. In our view. Jacqueline is an honest worker in the vineyard, attempting to make sense of a new medium that may, or may not, enhance her teaching.

Jacqueline was positive about the potential of CD-ROM talking books, but one must remember that she was a strong advocate of technology before the study was initiated. Thus, it is not surprising that she attempted to 'put the best face' on her efforts to implement the talking books into her curriculum. Her efforts were sincere, and one cannot deny the congruency of many of her intentions with actions. Equally important, we observed what we believed to be a genuine enthusiasm toward the technology, one echoed by her students.

Our study did show the difficulties that teachers face when implementing new information technology, and sometimes these problems go unrecognized. Teachers are busy professionals, and modifying an existing curriculum is not an easy task. In this instance, the teacher realistically decided that the CD-ROM books would not drive her curriculum; instead, they would used as a natural aspect of teaching and learning. In some cases, this desire was fulfilled. In other instances, this desire took on the appearance of being fulfilled, but, in our opinion, remained barren. However, we recognize that our analysis may not be congruent with that of the teacher.

Although teachers may plan to use technology in one manner, children may modify these ideas through their actions. In this study, we saw that the admirable notion of cooperative learning was truncated not because of the children's nature, but because the pairing patterns were discordant with the structure of the software. Educators who believe that technology automatically fosters effective learning styles and instructional patterns need to think seriously about the such findings.

Concluding Statement

This study represents the beginning of a three year longitudinal investigation into teachers' use of multimedia, especially CD-ROM talking books, in primary classrooms. Our goal in this initial phase of the investigation has been to demonstrate how one teacher used technology in the real world of schools. The study shows the potential of technology but also the reality of practice. If technology truly is to become the tool some educators

envisage, then we believe more studies of school based use must be carried out. These types of studies show the promise as well as the problems teachers encounter when using new information technology.

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