DOCUMENT RESUME

ED 314 891 EC 222 034

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TITLE Using the Technology of Closed-Captioned Television To Teach Reading to Handicapped Students. Performance Report.
INSTITUTION National Captioning Irst., Inc., Falls Church. VA.
SPONS AGENCY Department of Education, Washington, DC.
PUB DATE Feb 87
CONTRACT G-00-84-30067
NOTE 125p.
PUB TYPE Reports - Research/Technical (143) -- Tests/Evaluation Instruments (160)

EDRS PRICE MF01/PC05 Plus Postage.
DESCRIPTORS *Captions; Educational Television; *Hearing Impairments; *Instructional Effectiveness; *Learning Disabilities; Readability; Reading Ability; Reading Comprehension; *Reading Instruction; Sight Vocabulary; Teaching Methods; *Telecourses
IDENTIFIERS *Closed Captioned Television

ABSTRACT

This project investigated the effectiveness of using closed-captioned television in the teaching of reading to learning-disabled and hearing-impared students. Seven teachers of learning disabled students, and 45 students ranging in age from 8 to 13 years, from a large Maryland public school system participated in this study. The first two of nine studies focused upon the identification of appropriate program materials to be used in the seven subsequent studies. These preliminary investigations dealt with determining the readability of available captioned programs, and determining whether the readability level of the captions corresponded to student success in reading captions. Three studies then investigated the effects of captioned television viewing on the vocabulary and comprehension skills of both hearing/learning-disabled and hearing-impaired students. Four additional studies were conducted with teachers of learning-disabled and hearing-impaired students to determine their skill in using model captioned television reading lessons and their skill in developing and teaching captioned television reading lessons. Results suggest that the addition of captions to conventional television is an effective means of enhancing the sight vocabulary and comprehension skills of both learning-disabled and hearing-impaired students. Teachers effectively developed their own captioned lessons and were enthusiastic about their use in the teaching of a variety of reading skills. The appendices include sample researcher lessons, sample model lessons, and teacher evaluation forms. (JDD)

THE NATIONAL CAPTIONING INSTITUTE

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NATIONAL CAPTIONING INSTITUTE, INC.
February, 1987

ABSTRACT

In the past seven years a new dimension called closed captioning has been added to television viewing. Closed captions are subtitles which enable viewers to read the dialogue of a program. A growing number of educators believe that these captions provide a new source of reading material which can aid in the enhancement of reading ability. The overall goal of this project was to investigate the use of captioned television technology to improve the reading skills of two handicapped populations: learning disabled and hearing-impaired students. The results derived from research studies with teachers and students suggest that the addition of captions to conventional television is an effective means of enhancing the sight vocabulary and comprehension skills of both learning disabled and hearing-impaired students. Teachers effectively developed their own captioned lessons and were enthusiastic about their use in the teaching of a variety of reading skills. An additional benefit of this research was the development of a guide for educators interested in using captioned television in the teaching of reading.

ACKNOWLEDGEMENTS

Many of the ideas shared in this final report were contributed by those who were associated with the National Captioning Institute's grant. Of particular importance were the teachers, students and administrators from the Tennessee School for the Deaf and Prince George's County Public Schools who gave so generously of their time, energy, and expertise. Valuable guidance and assistance were provided by many other individuals who worked on this grant. The following is a listing of the grant's consultants:

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INTRODUCTION

Research has recently focused upon innovative methodologies and the use of technology to develop and improve the reading skills of handicapped children. Today there are approximately two million learning disabled youth and over 19 million persons who are hearing-impaired in the United States. Many learning disabled and hearing-impaired students have passed through the educational system without achieving sufficient reading and language skills to enable them to function effectively in society.

In the past seven years a new dimension has been added to television viewing. More than 130 hours of weekly television shows have closed captions which enable viewers to read the dialogue of a program. Closed captions, similar to subtitles on foreign films, can be seen only on television sets equipped with a special telecaption decoder. These captions have the potential of enriching the lives of both hearing and hearing-impaired individuals in a variety of ways. Captions on television are a new source of reading material. They present the reader with printed words in a motivating medium where the audio and video context help them understand words they might not already know. Initial research on the use of captioned television suggested that this medium is a highly motivating educational tool for enhancing the reading and language skills of learning disabled and hearing-impaired students (Koskinen, Wilson & Jensema, 1985; Koskinen, Wilson & Jensema, 1986).

According to the 1979-80 National Assessment of Educational Progress (1981), one-half of nine year olds surveyed watched three to four hours of television a day. At age 13, 48% of the students surveyed watched three to four hours of television a day. Adolescent poor readers watched more television than good readers in the same age group (Morgan & Gross, 1982). Other studies (Liss and Price, 1981; Sendelbaugh, 1978) revealed that hearing-impaired children spend as much or more time watching television as their hearing peers. Recent research into the relationship between television and youthful viewers has focused on viewing patterns, cognitive skill and television content, TV violence (Rubin, 1982), and television and school achievement (Fetler, 1984). Despite the quantity of research on the relationship between reading and television, results have been confusing and inconclusive (Williams, Haertel, Haertel & Walbert, 1982). One area that has received limited attention is the potential that captioned television and its educational use offer for the enhancement of reading ability and information acquisition.

Closed-captioned television is a relatively new technology that was developed specifically to help hearing-impaired viewers enjoy the benefits of television. In the last few years, reading researchers have been exploring the possibility that captioned television can also be used to help hearing students who are less proficient readers (Adler, 1985; Koskinen, Wilson & Jensema, 1985). Captioned television provides an exposure to print that goes beyond the print normally found on commercial television -

an exposure that can provide opportunities for poor readers to experience success in word recognition and reading fluency.

The multisensory characteristics of captioned television (video, audio, and printed captions) offer students the opportunity to view words in meaningful and stimulating contexts. In a study of third and fourth grade poor readers, Adler (1985) found that students who viewed words in context via captioned television recalled more words than students who used a printed copy of the captions. During projects with students who spoke English as a second language and clients at a summer reading clinic, student responses to questionnaires revealed high interest and motivation to learn reading skills through captioned television. The teachers working with these students reported that they would like to use captioned television to enhance reading instruction in their own classrooms (Koskinen et al., 1985). It seems clear that the potential of captioned television, which combines multisensory components of a medium that is both stimulating and educational, should be further investigated for the benefit of a wide range of readers/viewers.

The overall goal of this project was to study the use of captioned television technology to improve the reading skills of two handicapped populations: learning disabled and hearing-impaired students. To accomplish this goal, two studies for material development and seven major studies investigating captioned television were conducted. These studies examined the effects of captioned television on student reading performance and explored teachers' skill in using captioned TV lessons as part of classroom reading instruction.

NEED

Educational opportunities for handicapped students received major positive thrust with the passage of PL 94-142, the Education of All Handicapped Children Act in 1975, the Developmental Disabilities Act, and Section 504 of the Rehabilitation Act of 1973. The mandates and funded programs emanating from these acts have focused on the creation, extension and improvement of appropriate services for all handicapped learners. In the past ten years there has been a significant increase in the number of handicapped students served, consequently, there is a need to investigate a wide range of interventions consistent with the learning needs of handicapped students.

Recently, research has begun to focus upon innovative methodologies (Brown, Campione & Day, 1981; Capelli & Markman, 1982; Loper & Hallahan, 1982) and the use of technology to develop the reading skills of learning disabled and hearing-impaired students (Mason, Blanchard & Daniel, 1983; Previty, 1984; Reinking & Schreiner, 1985). Approximately two million learning disabled children and youth suffer from sensory or neurological impairments which limit their ability to understand the written word. While the "hearing-impaired" population of the United States has many definitions, information from the National Center for Health Statistics (1982) indicated that there are 19.8 million persons with hearing disorders. Over the years many learning disabled and hearing-impaired persons

have passed through the educational system without achieving sufficient reading skills to function effectively in society. Today, however, learning disabled and hearing-impaired students are learning to read in public school systems due to innovative instructional strategies and technological advances.

While technology has touched all our lives in many ways, it has had a particularly dramatic impact upon the lives of the handicapped. There is no doubt that the technological development of closed-captioned TV has enriched the lives of handicapped individuals by allowing them to interact more successfully with their environment.

Closed-captioned TV was originally developed for use by hearing-impaired persons who need a visual signal or the printed word to receive information. Captions provide a new source of reading material and as such, they have potential uses for learning disabled as well as hearing-impaired students. They can turn television into a moving story book, a steady stream of written language presented with both video and audio reinforcement. Viewers can see words on the screen, hear them spoken, and see them put into a visual context. One of the most exciting potential applications of closed-captioned television is its use as an educational tool in the teaching of reading.

Educators of deaf students have supported the captioning of television programs, citing the potential benefits to their students. Research indicates that hearing-impaired students learn significantly more from captioned materials than from those

which have not been captioned (e.g. Vader, 1972; Fischer, 1971; NCI, 1983; Nix, 1971; Norwood, 76; Propp, 1972).

In a survey conducted before many captioned television materials were available, more than half of the teachers were in favor of captioning selected television programs (Jackson & Perkins, 1974). Even more interest was evidenced in a survey conducted a year after closed captioning became nationally available. Administrators of programs for hearing-impaired students overwhelmingly believed captioning would facilitate the educational process in the classroom. Teachers in these programs were already aware of educational gains, noting that captioning had helped improve students' language skills and motivated them to read more (NCI, 1981). While there has been genuine enthusiasm from educators and other groups about the value of captioning, there is still only a small body of research which has explored the use of the technology of closed-captioned television for enhancing the reading skills of learning disabled and hearing-impaired students.

Two pilot studies were conducted using captioned TV during reading instruction which yielded positive results with remedial readers (Koskinen, Wilson, & Jensema, 1985). The first pilot involved two teachers and their pupils in a regular public elementary school classroom, using a variety of captioned television programs to develop skills in reading comprehension, vocabulary, and oral fluency for students with reading difficulties. The second study was conducted at the University of Maryland Reading Clinic with ten teachers employing the same

methods with 35 below average readers. The results of both pilot studies suggested that use of captioned TV during teacher-directed reading instruction enhanced vocabulary, comprehension, and oral fluency. There is also some evidence that viewing captioned TV without teacher assistance improved students' sight vocabulary (Adler, 1985).

Koskinen, Wilson, and Jensema (1986) investigated the effects of using captioned television as a medium for reading instruction with deaf students. The data indicated improvement in sight vocabulary retention, student motivation, and reading comprehension when captioned TV instruction was compared to regular reading instruction.

Captioned television is an exciting technological achievement. The dual coding of information through print and sound, combined with the powerfully popular medium of television, holds promise as an educational tool. Clearly, there is a need to investigate the potential of captioned TV for teaching reading to handicapped students who have been difficult to reach with traditional instructional materials and methods. Television, which is sometimes said to contribute to reading problems, may now, with the addition of captions, be used as one of the solutions to these problems.

RESEARCH REPORT

Overview of the Project

The purpose of this project was to investigate the use of captioned television as a medium for improving the reading skills of learning disabled and hearing-impaired students. In 1984, the Department of Education funded the project entitled "Using the Technology of Closed-Captioned Television to Teach Reading to Handicapped Students" to accomplish the following 10 objectives:

Objective 1: To determine the readability level and the rate of captioning of currently available captioned TV materials for children.

Objective 2: To determine whether the readability level of captioned TV text corresponds with student success in reading captioned TV text.

Objective 3: To investigate the effects of captioned TV (without instruction) upon the reading performance of learning disabled students.

Objective 4: To investigate the effects of captioned TV (with comprehension and vocabulary instruction) upon the reading performance of learning disabled students.

Objective 5: To investigate teachers' skill in using model captioned TV reading lessons with learning disabled students.

Objective 6: To investigate teachers' skill in developing and teaching captioned TV reading lessons to learning disabled students.

Objective 7: To investigate the effects of captioned TV (with comprehension and vocabulary instruction) upon the reading performance of hearing-impaired students.

Objective 8: To investigate teachers skill in using model captioned TV reading lessons with hearing-impaired students.

Objective 9: To investigate teachers' skill in developing and teaching captioned TV reading lessons to hearing-impaired students.

Objective 10: To disseminate the research results and the teacher training guide.

A series of nine research studies were carried out to meet these objectives.

Research on Program Materials

Objectives 1 and 2 focused upon the identification of appropriate program materials to be used in this project. Objective 1 dealt with determining the readability of available captioned programs suitable for use with students, while Objective 2 focused upon determining whether the readability level of the captions corresponded to student success in reading captions.

Objective 1: To determine the readability level and the rate of captioning of currently available captioned TV materials suitable for children.

In order to determine the readability level of television materials which are captioned for children, the following procedures were used. A total of forty captioned programs from different program genres (cartoons, situation comedy, and children's educational programs) were viewed by two experienced teachers of reading. Meaningful 2 to 3 minute segments were selected from each of these programs. Three 100 word portions were then taken from the beginning, middle and end of the

segments' printed text of captions and used as the unit of analysis for determining readability.

Six different readability formulas were reviewed for their suitability for use with program dialogue. While no readability formula has been standardized on materials with dialogue, there are a number that are appropriate for a wide range of materials. Both the Fry and the Rix Readability formulas were used because they are appropriate for beginning as well as advanced reading levels, and are easy for classroom teachers to administer. These formulas are based on the number of syllables or letters per word and on sentence length. Programs varied in readability from very low readability levels in Sesame Street (1st to 3rd grade level), to 3-2-1 Contact (2nd to 8th grade level), and Ripley's Believe It or Not (7th to 9th grade level). Situation comedies such as Different Strokes ranged in reading level from 1st to 4th grade, while cartoons, such as Scrappy Puppy and Fat Albert, were on the 1st to 3rd grade level.

In order to determine the reading rate which is required for reading materials which are captioned for children, the following procedures were implemented. Words per minute were calculated for each of the selected segments. Calculations were made from the printed text of captions which indicate the number of seconds a caption line is displayed on the video. The caption speed on programs frequently viewed by children ranged from 40 to 120 words per minute with the majority having a caption speed above 110 words per minute. The caption speed for normal adult programming is 120 words per minute. A review of the literature

revealed that there are established criteria for the number of words read per minute during silent reading for readers at different grade levels. For example, the average silent reading rate of a student reading on the second grade level is 86 words per minute, while a student on the third grade reading level reads 116 words per minute. From the data collected to date, it appears that the speed of the captions currently used on children's programming is most appropriate for readers at the third grade level and above. Data from Objectives 2 through 9, however, provided information related to the levels of captioned materials students can actually read. The assessment of captioned materials in Objective 1 considered the difficulty of the text and speed of the captions, but did not consider the contributions the video may make to the readability of captions.

Objective 2: To determine whether the readability level of captioned TV text corresponds with student success in reading captioned TV text.

The following procedures were implemented in order to determine whether students, after watching captioned television programs, could read a text of captions which was at their determined reading level. Twenty-one learning disabled students whose reading levels were two or more years below their grade placement according to the Botel Word Opposites Test participated in this pilot study. The students were in grades four, five, and six. Twelve captioned video segments were then selected for use with the students. Video segments were identified in each of three areas of captioned programming available for children:

situation comedy; cartoons; and science programming. Programs such as Diff'rent Strokes (situation comedy), Scrappy Puppy (cartoon), and 3-2-1 Contact (science education) were used. Introductory information was prepared and presented for each segment so the student was informed about the topic to be viewed. In addition, a passage for testing oral reading accuracy was selected. The passage was a 100-word segment from each printed text of captions.

Each student met individually with a researcher on at least three different occasions in order to view video segments from each area: situation comedy, cartoons and science programming. During these sessions students first viewed the captioned program segment, and then read orally from the 100 word printed text of captions. The first program viewed had captions appropriate to the student's reading level. If the student could read the captions, they viewed another program at the next highest level. If they did poorly, they viewed another program at the next lowest level. For example, a student who had a Botel Word Opposites reading level of 3.0 would view a program at the 3.0 reading level and then read the 100 word passage. If the student was successful, the next program was viewed at the 3.5 reading level. If the student was unsuccessful at reading the printed text of captions, the next program was viewed at the 2.5 reading level. All subjects viewed at least one video segment in each of the three areas.

The Betts 95% word accuracy criterion was used to determine success at reading the 100 word text of captions passages. Substitutions that were semantically correct were not counted as errors

The results of this study indicated that the vast majority of the subjects could successfully read the captions at their designated grade level (94%) and that over half (51%) could successfully read the science programs and situation comedies which were above their indicated reading level (Table 1). In only four instances were subjects unsuccessful in reading the printed text of captions at their grade level (one for cartoons and three for science programs). In all four instances, however, the subjects were successful in reading the materials designated as one level below their indicated reading level.

TABLE 1

Number of Students Who Could Successfully Read Captions At or Above Their Designated Reading Level (N = 21)

	At Grade Level	Above Grade Level
Cartoons	20	7
Science Education	18	11
Situation Comedies	21	14

The findings of this pilot suggest that students can successfully read the printed text of captions which were determined to be at their grade level. The results also lend credibility to the procedures used to determine the

appropriateness of the materials used for instructional purposes in the subsequent captioning research with learning disabled and hearing-impaired students.

Research with Learning Disabled Students

Objective 3: To investigate the effects of captioned TV (without instruction) upon the reading performance of learning disabled students.

The purpose of this study was to systematically examine the effects of video, audio and captions on the incidental learning of reading skills by learning disabled students. Specifically, it investigated whether there were differences among four treatment conditions with respect to students' sight vocabulary, comprehension, and oral reading fluency. The four treatment conditions were 1) viewing TV with captions and sound, 2) viewing TV with captions and no sound, 3) viewing conventional TV with sound but no captions, and 4) reading the printed text of captions.

Subjects

Seventy-seven learning disabled students from four Maryland public schools participated in this study. The students were reading on the first through third grade levels as determined by individualized reading tests, and scored at the fourth grade

level or below on the Botel Word Opposites Test. They ranged in age from 9 to 13, were reading at least two years below their grade level, and were receiving State of Maryland Level 2 or 3 special education services which entitled them to one to three hours a day of special out-of-classroom assistance.

Materials

The video/text materials for this project consisted of four excerpts from the children's science TV program 3-2-1 Contact that had been identified in Objective 1. Since some students in this study were going to see TV programs and others were just going to read the program's text of captions, these materials had to be comprehensible to a reader who did not see the video action or hear the audio input. Because of this restriction, only a limited range of programming could be selected. Two experienced reading teachers viewed video tapes of children's programs to identify meaningful segments that had captions which could be understood without the accompanying audio or video. Forty-five segments were identified. These segments were then rated on a one to five scale in the categories of interest, educational value, and match between the content of captions and video action portrayed on the screen. Captions that were highly rated in all categories were then rated for comprehensibility and interest by a reading specialist who had not seen the videos.

The four video/text segments selected for use in this study had captions that were comprehensible when read without the accompanying video or audio. They were similar in content

(science), interest level, word count (about 200 words), reading level (3rd-7th), length of the video segment (1.5 to 3 minutes), and caption speed (107-122 wpm). In addition, two five-minute captioned video segments were selected from 3-2-1 Contact programs and four two to three minute segments were selected from cartoon programming, such as Fat Albert and The Littles, to be viewed by all subjects involved in the study.

Parallel procedures were developed to assure consistency across the four treatment conditions. They included introductory material for each segment, procedures for viewing or reading, and guidelines for administration of the assessment tasks.

Assessment materials developed for this study included word recognition, comprehension, and oral reading fluency measures. A word recognition test, consisting of 20 content vocabulary words selected from the text of captions, was created for each of the four segments. Another 20-item word recognition test to measure delayed recall was also developed from words randomly selected from each of the four word recognition tests (five words per test). Two different types of comprehension tasks were developed for the four sessions. One of these was a 5-item cued recall test which included both textually explicit and textually implicit questions. Another comprehension measure involved the cloze procedure. Three cloze tasks were developed, two as practice activities and one as an assessment instrument. The cloze tasks consisted of deletions of selected content words from the printed text of captions. In addition, a 100 word passage for oral reading was selected from the captions of the video segment used in the final session.

Procedures

Students in each school were randomly assigned by Botel Word Opposites reading levels to one of the following four treatment conditions: 1) captioned TV with sound, 2) captioned TV without sound, 3) conventional TV, and 4) text of captions. Four experienced reading teachers (researchers) conducted sessions with students in each of the four treatment conditions in their assigned school. Students in each of the conditions met with the researcher four times over a three-week period for the treatment sessions. Researchers worked with groups of seven or fewer students and each treatment session was approximately 30 minutes in length.

During each of the four treatment sessions, students in Condition 1 viewed a video segment with audio and captions; students in Condition 2 viewed a video segment with captions, but without audio; students in Condition 3 viewed a video segment with sound but no captions; and students in Condition 4 read a printed copy of the video segment's captions. To help orient students to captioned television and the paper script of captions, students in each conditi viewed a segment of captioned TV at the beginning of Sessions 1 and 2, and in Session 1 read a portion of the video's printed text of captions.

Students in each treatment session were given a brief, one sentence introduction to the topic that was to be viewed or read and were also directed to read or watch carefully so they could remember the important ideas. After either viewing or reading a segment (according to condition), students participated in

assessment activities. As a final activity for all sessions, students watched a short cartoon segment. These high interest segments were shown at the end of each session to control for the motivating effects of television.

Assessment activities for the study involved the administration of word recognition, comprehension and oral reading measures. At each treatment session students were given a word recognition test and, six to eight days after the fourth treatment session, the subjects also completed a 20-item delayed word recognition test. In all sessions, sight word recognition was assessed individually while the other members of the group worked on a maze or drawing activity. Cloze practice activities were given during the first and second sessions and a cloze test was administered during the fourth session. These cloze tasks required students to read a text with deletions and write in the missing words. In addition to these activities, students read the comprehension questions and wrote responses during the third session, and their oral reading of the printed text of captions was tape recorded for subsequent analysis in the fourth session.

The assessment instruments for this study were scored according to the following procedures. On the 20-item word recognition tests, subjects received five points for each correct response out of a possible 100 points. The 10-item cloze test was scored both for exact replacements and for semantically appropriate replacements. Subjects received ten points for each acceptable response resulting in a possible score of 100 points for each analysis. On the 5-item questions test, subjects

received two points for each correct response resulting in a possible score of ten points. For the oral reading miscue analyses, which involved scoring for both exact matches to text and semantically appropriate replacements, subjects received one point for each acceptable response resulting in a possible score of 100 for each analysis.

Results and Discussion

To verify the equivalence of treatment groups, a one-way analysis of variance was conducted on the Botel Word Opposites Test scores. No significant differences were found [$F(3,73) = .5642$, $p > .05$].

Multivariate repeated measures were used to analyze the word recognition scores for the four sessions. No significant differences were found among the four treatment conditions [$F(3,70) = 2.18$, $p > .05$]. A subsequent chi-square analysis using students scores which reached the criterion of 90% on the word recognition test was then conducted. The results revealed statistically significant differences in favor of the captioned-TV-with-sound group when compared to the text-of-captions group [$X^2(1, N=35) = 7.20$, $p < .01$], and in favor of the captioned-TV-with-sound group when compared to the captioned-TV-without-sound group [$X^2(1, N=35) = 5.76$, $p < .05$].

The cloze test was scored in two ways: 1) number of words which were an exact match with the text, and 2) number of words which were semantically appropriate. Analysis of variance procedures revealed no significant differences among treatment conditions for the number of words which exactly matched the

text. However, statistically significant differences were found among the four treatment conditions for words which were semantically appropriate ($F(3,72) = 4.74$, $p < .05$). Post-hoc pair-wise comparisons using the Student-Newman-Keuls procedure revealed statistically significant differences in favor of the captioned-TV-with-sound group ($M = 46.00$) and the conventional TV group ($M = 45.79$) when compared to the text-of-captions group ($M = 26.84$) and the captioned-TV-without-sound group ($M = 25.00$).

An analysis of variance of the scores on the cued recall test revealed significant differences among the treatment conditions ($F(3,73) = 5.72$, $p < .001$). The significant differences were in favor of the captioned-TV-with-sound group when compared to the text-of-captions group, and in favor of conventional TV when compared to the text-of-captions and the captioned-TV-without-sound groups.

Two scores derived from the oral reading miscue analysis were used in this study: 1) words accurately pronounced, and 2) words that were semantically appropriate. While analysis of variance results only approached significance for the words accurately pronounced [$F(3,71) = 2.63$, $p = .06$)], statistically significant differences were found among the four treatment conditions for number of words which were semantically appropriate [$F(3,71) = 2.83$, $p < .05$]. Post-hoc pair-wise comparisons using the Student-Newman-Keuls procedure revealed statistically significant differences in favor of the captioned-TV-with-sound group ($M = 92.68$) and the captioned-TV-without-sound group ($M = 91.50$) when compared to the text-of-captions group ($M = 87.11$).

The results of this study suggest that both captioned TV with sound and conventional TV are well worth exploring as media for enhancing the reading skills of learning disabled students. It is especially noteworthy that in this study captioned TV had a positive effect on the sight vocabulary of learning disabled students. A most promising finding was the significant performance on the word recognition tasks of the captioned-TV-with-sound group. While there were no significant differences on the repeated measures analyses, the chi-square analysis revealed significantly more instances of students scoring at or above 90% in the captioned-TV-with-sound group when compared to the text-of-captions and the captioned-TV-without-sound groups. This finding suggests that the addition of captions to conventional TV may be a significant factor in developing the word recognition skills of learning disabled students.

On the cloze task, the captioned-TV-with-sound group and the conventional TV group did significantly better than the captioned-TV-without-sound and text-of-captions groups. On the questioning task, the captioned-TV-with-sound group did significantly better than the text-of-captions group. The conventional TV group was superior to both the text-of-captions group and the captioned-TV-without-sound group.

These findings support the hypothesis that conventional TV, as well as captioned TV with sound, enhances comprehension for disabled learners. The audio does not appear to interfere with young childrens' processing of the captions. In fact, the

findings of this study support the theoretical notion that simultaneous processing enhances learning.

With respect to the performance of subjects on the oral reading task, miscue analysis results for words accurately pronounced only approached significance. There were, however, statistically significant differences for words which were semantically appropriate. When compared with the text-of-captions group, both captioned TV groups (with and without sound) made significantly fewer semantically inappropriate miscues when reading words in context. This finding, while tentative in nature, can be interpreted as an indication that the addition of captions enabled the subjects to utilize larger language or idea-bearing units in the text and to focus on meaning.

Objective 4: To investigate the effects of captioned TV (with comprehension and vocabulary instruction) upon the reading performance of learning disabled students.

The purpose of this study was to systematically examine the effects of video, audio and captions on the reading performance of learning disabled students who received vocabulary and comprehension instruction. Specifically, this study investigated whether there were differences among four treatment conditions with respect to students' sight vocabulary, comprehension, and oral reading fluency. The four treatment conditions were 1) viewing TV with captions and sound, 2) viewing TV with captions and no sound, 3) viewing convential TV with sound but no captions, and 4) reading the printed text of captions.

Subjects

The 77 learning disabled students from Maryland public schools who participated in the study for Objective 3 also served as subjects in this study. All of these students had participated in four sessions of either viewing or reading captions (according to the condition to which they had been randomly assigned).

Materials

The video/text segments for this project consisted of four excerpts from the children's science TV program 3-2-1 Contact. Procedures for identifying these materials were the same as those described in the materials section in Objective 3. These segments were similar in content (science), interest level, word count (approximately 200 words), reading level (3rd-7th), length of the video segment (1.5 to 3 minutes), and caption speed (107-122 wpm.). In addition, four 2 to 3 minute segments were selected from cartoon programming, such as Scrappy Puppy and The Littles. These high interest, meaningful segments were shown at the end of each session so students in all sessions could have the experience of watching a TV program.

Parallel lessons that focused on vocabulary and comprehension skills were developed for each of the four video segments (see samples in Appendix A). The lessons included 1) an introduction to the topic of the segment, 2) viewing or reading a segment, 3) vocabulary study, and 4) discussion of the content of the segment. The introduction included student discussion about their knowledge of the topic and teacher presentation of a few

important facts about the topic (if they had not been introduced by the students). Two or three important content words or phrases were also introduced at this time. Students were then given a purpose for viewing or reading and then these purposes were discussed briefly after viewing or reading. Vocabulary study included introduction of three important content words, location of the words in the video or printed text of captions (script), and discussion of their meaning in context. A final summary activity included a brief discussion of the most interesting things they learned about the topic.

Parallel procedures were developed to assure consistency across the four treatment conditions. Assessment materials were also developed for each of the sessions. A word recognition measure, consisting of 20 content vocabulary words selected from the text of captions, was created for each of the four segments. Comprehension assessment measures were developed for two of the sessions. One measure was a five-item short answer test which included both textually explicit and textually implicit questions. The other measure was a cloze test that required students to read the script of captions and fill in deleted content words. In addition, a 100-word passage for oral reading was selected from the captions of the video segment used in the final session.

Procedures

Students who has participated in the study which investigated the effects of captioned TV without instruction (Objective 3) served as subjects in this study. These students

had previously been randomly assigned by Botel Word Opposites reading levels to one of the following four treatment conditions: 1) captioned TV with sound, 2) captioned TV without sound, 3) conventional TV with sound, and 4) text of captions. The four experienced reading teachers from the previous study who worked with the four treatment conditions, continued to work with the same intact groups. Students in each of the conditions met with the teachers four times over a three-week period. Each teacher worked with groups of seven or fewer students and each session was approximately 40 minutes in length.

During the first phase of each session, students received vocabulary and comprehension instruction. This included an introduction to the topic to be viewed or read, discussion of key words, viewing or reading information on the topic, vocabulary study and discussion of the topic. Students in Condition 1 viewed a video segment with audio and captions; students in Condition 2 viewed a video segment with captions, but without audio; students in Condition 3 viewed a video segment with sound but no captions; and students in Condition 4 read the printed copy of the video segment's captions.

After the instructional phase of each session, students were given a word recognition test. Sight word knowledge was assessed individually while the other members of the group worked on a maze or drawing activity. Comprehension was assessed during the second and last session with a cloze test and with comprehension questions during the third session. In addition, during the last session, students' oral reading of the printed text of captions

was tape recorded for subsequent analysis. As the final activity for each session, students watched a short cartoon segment. This was done so that all subjects would have the experience of viewing a TV show at each session.

Results and Discussion

To verify the equivalence of treatment groups, a one-way analysis of variance was conducted on the Botel Word Opposites Test scores. No significant differences were found [$F(3,73) = .5642$, $p > .05$].

Multivariate repeated measures were used to analyze the word recognition scores for the four sessions. No significant differences were found among the four treatment conditions. A subsequent chi-square analysis using students' scores which reached the criterion of 95% on the word recognition test was then conducted. The results revealed statistically significant differences in favor of the captioned-TV-with-sound group when compared to the text-of-captions group (X^2 (1, N=55) = 11.58, $p < .001$), and in favor of the captioned-TV-with-sound group when compared to the captioned-TV-without-sound group, (X^2 (1, N=55) = 4.22, $p < .05$).

Multivariate repeated measures were used to analyze the oral reading, cloze, and cued recall scores. There were no significant differences found among the four treatment conditions with respect to oral reading and cloze performance. Analysis of the cued recall scores revealed statistically significant differences in favor of the conventional TV group [$F(3,73) = 3.3169$, $p < .02$] when compared to the captioned-TV-without-sound and the text-of-captions groups.

Given the fact that conventional television provides much of the information needed for comprehension, it is not surprising that the conventional TV group outperformed the captioned-TV-without-sound and the text-of-captions groups on the cued recall task. It should be noted that there was no significant difference between the conventional TV group and the captioned-TV-with-sound group with respect to cued recall performance.

In this study the teacher-directed vocabulary and comprehension lessons were uniform across the four treatment conditions. The only difference was the source of materials upon which the lessons were based (captioned TV with sound, captioned TV without sound, conventional TV, script of captions). Given the emphasis on direct teacher instruction, the finding that vocabulary and comprehension lessons based upon captioned TV materials had a positive effect on sight vocabulary is an important one. It also should be noted that in this study the time subjects were viewing captioned TV was relatively brief. The actual viewing or reading was based on 2-3 minute segments with one rereading or reviewing. In light of the very limited time of subject exposure and the positive findings in favor of captioned TV, it is clear that this medium deserves further attention from educators and reading researchers.

Objective 5: To investigate teachers' skill in using model captioned TV reading lessons to learning disabled students.

The purpose of this study was to examine whether teachers of learning disabled students could effectively use model captioned TV reading lessons. Specifically, teachers were trained to use captioned TV reading lessons and then they used eight prepared model TV lessons over a five-week period.

Subjects

Seven teachers of learning disabled students who were reading below grade level served as subjects in this study. Three of the teachers were special education resource teachers and four taught in self contained special education classrooms. The 45 students ranged in age from 8 to 13 with reading levels from first to fourth grade. All participants were from three schools in a large Maryland public school system.

Materials

A series of four video packages were assembled for use in this study. Each package consisted of a captioned TV program, a printed text of the program's captions (script) for the teacher, and multiple copies of these printed scripts for use by the students. A set of eight model reading lessons, teacher evaluation and observation forms, as well as teacher training materials were also developed.

Video Packages. Four captioned TV programs were selected from those identified in Objectives 1 and 2. Since teac[illegible] in previous research studies had successfully used a vari[illegible]

program genres, three different types (science, cartoon, and situation comedies) were selected for use. They included two science segments from 3-2-1 Contact that had been used in Objectives 3 and 4, and two other programs, the cartoon Scrappy Puppy and the situation comedy Diff'rent Strokes, which had been successfully used in previous research studies (Koskinen, Wilson, & Jensema, 1985; Koskinen, Wilson, & Jensema, 1986). The programs varied in length from a two-minute program on termites to a complete 22 minute situation comedy. Also included in each video package were the printed text of captions (script) from the captioned TV program. A sufficient number of these scripts were included so each student in a group lesson would have their own copy.

Model Lessons. The eight model reading lessons, two per program, were 30 minutes in length and focused on vocabulary and comprehension skills (see samples in Appendix B). These lessons were developed so teachers would have experience in using different types of programs to teach a variety of reading skills. The pair of lessons that were designed for each program related to each other and teachers were encouraged to use them within the same week. Each model lesson included the following parts:

- an introduction to the activity,
- viewing a captioned TV segment,
- reading skill instruction related to parts of the TV segment,
- use of the paper script of captions, and
- a brief activity to provide closure.

The eight lessons were developed to provide the teachers with the opportunity to use captioned TV to teach the skills of vocabulary, locating information, character analysis, and

prediction at least twice. In addition, because paper scripts of captions were used in each lesson, teachers had the opportunity to see how a variety of skills could be developed using these scripts.

Teacher Evaluation Forms. Two teacher evaluation forms were developed for use in this study. One form was used by the teachers to evaluate each of their eight lessons and the other was a final questionnaire comparing the types of lessons and evaluating captioned TV use in general. (See samples in Appendix C). The first lesson form contained seven questions and a space for comments. Teachers were asked to use a five point Likert scale to answer questions related to whether she/he followed the lesson plan and was comfortable with the equipment. Teachers were also asked to evaluate the lesson and assess student interest, response accuracy, and whether they were on-task.

The 12-item final teacher evaluation form consisted of 12 questions related to teacher perceptions of student motivation and quality of learning. In addition, there were questions related to the type of training teachers received, the quality of lessons used, and their interest as well as skill in using captioned materials.

Observer Evaluation Forms. To determine whether the teachers were able to follow a prepared lesson, teachers were observed three times. Forms for the observers were developed for the second, fifth, and eighth lesson taught by each teacher. The three forms followed a similar structure, noting the lesson

objective, the elements of the lesson, teacher use of equipment and teacher and student response to the lesson (see Appendix C). The interrater reliability among the four experienced observers who rated the teacher lessons ranged from .92 to 1 on the various parts of the lessons. A video tape of a lesson was used to obtain interrater reliability.

Teacher Training Procedures and Materials: To assure consistency in teacher training across the three schools, all teacher training was conducted by the first author, and a script was developed for the initial two-hour training session, and subsequent one-half hour sessions. Procedures for the training sessions were similiar to those used in a previous study (Koskinen, Wilson, & Jensema, 1986), but were adapted for use with teachers of learning disabled students. The first session included:

- an overview of the captioned TV research project,
- a presentation of a short TV segment with suggested ways it could be used to develop vocabulary and comprehension skills,
- a rationale for the use of captioned TV in the reading program, including the value of high interest material and the benefits of video context as an aid to reading comprehension,
- modeling the parts of the first lesson teachers would be using with their students in the classroom,
- practice in using the video equipment, and
- a discussion of data collection procedures which included observation and their evaluation of their own lessons.

During the training teachers received a packet of materials for their subsequent use. It included a description of the research project, a published article describing previous research with captioned TV and reading, the first two model

lessons, a description on how to use the video recorder with captioned tapes, and a set of eight lesson evaluation forms. The additional six lessons were given to the teachers as they completed the earlier ones.

An additional follow-up 30 minute training session was conducted for teachers half-way through the project. This session was designed to provide a forum for sharing ideas, asking questions and discussing the benefits and concerns related to using captioned TV reading lessons. Discussion was initiated by asking questions related to the first four lessons. These questions included procedures for vocabulary development, locating information in the script, and character analysis.

Procedures

The teachers in the project were asked to use a sequenced set of eight prepared captioned TV lessons as part of their reading program. To enable them to do this, teachers received a two-hour training session on using captioned TV in the teaching of reading. This session provided a rationale for using captioned TV, discussed ways to use video segments in teaching reading, and modeled an actual lesson and use of the video equipment. Teachers also participated in a 30 minute follow-up session when they were approximately half-way through their set of lessons. This session provided teachers with an opportunity to ask questions and discuss the benefits and problems related to using captioned TV lessons.

Teachers taught the eight lessons over a five-week period to a group of learning disabled students. They used the lessons in

a specified order and were asked to teach the pair of lessons that related to a specific TV program within one week. While teachers were asked to follow the general format of the lesson if possible, they were encouraged to adapt the plan if it was not appropriate for their students. Teachers evaluated each of their lessons after it was taught and then completed a general evaluation after the last lesson.

To assess teachers' ability to follow prepared lessons, teachers were observed teaching a captioned TV lesson three times. Observers, who were experienced teachers, observed and evaluated the teachers' second, fifth, and eighth lessons.

Results and Discussion

Descriptive procedures were used to analyze the data from the following sources: teachers' evaluations of each lesson, teachers' general evaluations, and observers' evaluations.

The seven teachers in this study conducted eight captioned television lessons using model lesson plans based upon specific captioned television program segments. The teachers evaluated each of the eight lessons. The teachers responded to four questions using a five-point Likert Scale, 1 = Not at All, 3 = Some of the Time, and 5 = All of the Time (see Table 2). The teachers reported that they followed their lessons plans (M = 3.91), were comfortable with the equipment (M = 4.29), the students were on task (M = 4.18), and the students responded accurately during the lesson (M = 4.24).

TABLE 2

Teachers' Evaluation of Model Lessons 1-8

	Overall Average Means Across Lessons	S.D.
Followed Lesson Plan	3.91	.36
Comfortable with Equipment	4.24	.30
Students On Task	4.18	.35
Students Accurately Responded	4.24	.33
Student Interest	4.35	.26
Overall Evaluation of Lesson	3.81	.41
Overall Evaluation of Lesson Plan	3.67	.38

Using a 1-5 scale, the teachers rated student interest, their overall evaluation of the lessons, and the lesson plan (1 = Poor, 5 = Excellent) (Table 2). The teachers' overall average ratings of student interest ranged from "good" to "excellent" (M = 4.35). The teachers' overall ratings of the lessons ranged from "good" to "excellent" (M = 3.81), and the overall ratings of the lesson plans ranged from "good" to "very good" (M = 3.67).

Upon completion of the eight lessons, teachers responded to a general evaluation questionnaire about captioned TV. Using a 1-5 scale (1 = Poor, 5 = Excellent) the teachers' general reactions to captioned TV ranged from "very good" to "excellent" (M = 4.29). In addition, the teacher's ratings of student motivation ranged from "very good" to "excellent" (M = 4.57), the ratings for the quality of the tapes for instruction ranged from "good" to "excellent" (M = 4.43), and the ratings for the quality of student learning ranged from "fair" to "excellent" (M = 3.57).

When asked which TV reading lessons were best for developing reading skills (by indicating their first and second choice) the responses were, in order of preference: 3-2-1 Contact segments "Termites" and "Parachutes", the cartoon Scrappy Puppy and the situation comedy Different Strokes. It is noteworthy that each TV segment was identified as either a first or second choice by at least one teacher. The teachers reported that the students liked the cartoon Scrappy Puppy and the situation comedy Diff'rent Strokes best.

All seven teachers reported that even if they were not involved in a research project they would probably use captioned TV in their classrooms on the average of once or twice a week. A majority (6) found the scripts to be useful in the lessons. Only two of the seven teachers reported that they experienced some difficulty using the TV and the VCR equipment. Six teachers reported that the training they received was sufficient to enable them to use the prepared captioned TV lessons successfully.

In order to determine whether teachers were following the instructional models which had been presented for using captioned television, the 2nd, 5th, and 8th lessons for each teacher were rated by trained observers. The observers rated each lesson on 1) following the lesson plan, 2) use of equipment, 3) comfort with the lesson plan, 4) student responses, and 5) student on task behavior. A Likert scale was used (1 = No, 2 = A Little, 3 = 50/50, 4 = Mostly, 5 = Always). The observers also evaluated the overall lesson and student interest using a Likert scale

(1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, 5 = Excellent). In addition, the observers recorded the length of each lesson. The ratings of the observers concerning all aspects of the observed lessons were high (see Table 3). Their overall rating for the lessons was "very good" (M = 4.03) and student interest was also rated as "very good" (M = 4.22). The average lesson was approximately 35 minutes in length.

TABLE 3

Observers' Evaluations of Lessons 2, 5, and 8

	Overall Average Means Acress Lessons	S.D.
Followed Lesson Plan	4.19	.38
Used Equipment Easily	4.45	.27
Comfort with Lesson	4.36	.24
Students Responded Acccurately	4.00	.24
Students were on Task	4.09	.03
Overall Lesson Evaluation	4.03	.52
Student Interest	4.22	.19
Lesson Time	35.80	2.17

The findings of this study revealed that teachers were able to effectively use model captioned TV reading lessons with learning disabled students. Both the teachers' self-reported evaluations and the evaluations of the trained observers indicated that the teachers' lessons were of high quality and that student motivation and on-task behavior were high.

Objective 6: To investigate teachers' skill in developing and teaching captioned TV reading lessons to learning disabled students.

In this study, teachers' skill in creating and using their own captioned TV lessons was examined. Teachers who had already used prepared captioned TV reading lessons were provided with training on how to develop their own lessons. They were asked to develop and teach eight lessons that would be appropriate for their learning disabled students.

Subjects

The seven teachers and their 45 students from Objective 5 participated in the study. They began the training and teaching activities of this study approximately a week after completing the activities for Objective 5.

Materials

Ten video packages, each containing a captioned program and scripts were assembled for use in this study. In addition, a teacher's guide, teacher evaluation and observation forms, as well as a student questionnaire were developed.

Video Packages. Ten complete captioned programs were selected for use from those identified in Objectives 1 and 2 (see Appendix D). They included three 3-2-1 Contact science programs, a general information program, Ripley's Believe It or Not, and a children's program, Sesame Street. All of these programs were one hour in length. Three cartoons The Littles, Scooby Doo and Scrappy Puppy, and two Diff'rent Strokes situation comedies were

also selected. These programs ranged in length from 12 to 22 minutes. Also included in each video package were scripts of captions for every student in the reading group.

Teacher's Guide. A teacher's guide was written so teachers would have resource material to refer to when they began preparing their own lessons. The guide contained an introduction to the idea of using captioned TV, a section that provided an overview for using captioned TV in reading instruction, and a section that detailed ideas for getting started. This final section included the following topics:

- getting to know your equipment,
- planning captioned TV lessons which involves selecting and previewing programs, determining reading skills, and writing a lesson plan,
- using captioned TV lesson in the classroom.

(The teacher's guide Have You Read Any Good TV Lately? contains the complete guide with all the revisions and additions made as a result of the entire DOE project. Parts 1, 2 and 3 were given to the teachers in this study.)

Teacher Evaluation Forms. Two evaluations forms which were similar in structure and purpose to those used in Objective 5 were developed for Objective 6 (see Appendix E). The first form was used by teachers to evaluate each of their lessons. It contained a space for teachers to briefly describe their lesson and six questions that were used on the Objective 5 evaluation form. The 13-item final evaluation form related to teacher perceptions of student motivation and quality of learning. In addition, there were questions related to the type of training

teachers received, the quality of lessons used, and their interest as well as a skill in using captioned materials.

Observer Evaluation Form. To determine whether the teachers were able to develop and teach their own captioned TV reading lessons, teachers were observed two times. The form developed asked the observer to determine the lesson objective, note reading activities related to the objective, and the way the video captions and script of captions were used (see Appendix E). In addition, questions from the observer form used in Objective 5 related to teacher use of equipment, and teacher and student responses to the lesson also were included.

Student Questionnaire. A four-item questionnaire (see Appendix E) was developed to assess student interest in captioned TV reading lessons. On a five-point Likert scale ranging from "Not at All" to "All of the Time", students were asked questions related to how they liked viewing captioned TV and whether it helped them learn to read.

Procedures

The seven teachers in this project were asked to develop and teach eight captioned TV reading lessons as part of their reading program. These lessons were to be approximately 30 minutes in length and focus on skills that were appropriate for their learning disabled students. To provide assistance in lesson development, teachers participated in an initial 90-minute training session and then in a 30-minute follow-up meeting.

Training was conducted at each of the participating schools. To assure consistency across schools, all training was conducted by the first author.

Procedures for training were adapted from those used in a previous study (Koskinen, Wilson, & Jensema, 1986). The initial session focused on different aspects of planning captioned TV reading lessons. Since the teachers had already used prepared lessons, this session began with a discussion of the types of reading skills and video segments they had used successfully. Teachers were given the teacher's guide and the following aspects of lesson planning were discussed in light of their previous experience with prepared lessons:

- selecting high interest programs,
- previewing TV programs,
- determining reading skills, and
- writing a lesson plan.

A follow-up training was conducted for teachers half-way through the project. This session was a discussion session similar to the one held during Objective 5. It provided a forum for sharing ideas, asking questions, and discussing the benefits and concerns related to using captioned TV.

Teachers developed and taught eight lessons over a five-week period to a group of learning disabled students. They were provided with ten complete video programs which were similar to those they had previously used. The video materials included

cartoons, situation comedies and science programs. Teachers were encouraged to use any of the segments from the available TV programs, but were asked not to use a program segment more than four times. This was requested so the teachers would have the experience of selecting and using more than one segment. While teachers had been exposed to a model in Objective 5 of using two lessons per program or meaningful segment, they were not required to follow that format. Teachers evaluated each of their lessons after it was taught, and completed a general evaluation after the last session. In addition, they asked students to evaluate captioned TV by completing a short questionnaire which was read to them.

To assess teachers' ability to create and teach their own captioned TV reading lessons, teachers were observed twice, during either the second, fifth or eighth lesson. The experienced teachers who were observers in Objective 5 also served as observers in this study.

Results and Discussion

Descriptive procedures were used to analyze the data obtained from the following sources: teachers' evaluations of each lesson, teachers' general evaluations, observers' evaluations, and students evaluations.

Teacher Evaluations. The seven teachers in this study conducted eight captioned television lessons using lessons plans which they developed based upon program segments of their choice. The teachers evaluated each of the eight lessons. The teachers

responded to four questions using a 5 point Likert Scale, 1 = Not at All, 3 = Some of the Time, and 5 = All of the Time (see Table 4).

Teachers reported that they followed their lessons plans (M = 4.49), were comfortable with the equipment (M = 4.40), the students were on task (M = 4.46), and the students responded accurately during the lesson (M = 4.32).

TABLE 4

Teachers' Evaluation of Their Own Lessons 1 - 8

	Overall Average Means Across Lessons	S.D.
Followed Lesson Plan	4.49	.26
Comfortable with Equipment	4.40	.16
Students on Task	4.46	.23
Students Accurately Responded	4.32	.34
Student Interest	4.28	.33
Overall Evaluation of Lesson	3.90	.36

Using a 1-5 scale, the teachers rated student interest and their overall evaluation of the lessons (1 = Poor, 5 = Excellent) (Table 4). The teachers' ratings of student interest ranged from "good" to "excellent" (M = 4.28). The teachers overall ratings of the lessons ranged from "good" to "excellent" (M = 3.90).

Upon completion of the eight lessons, teachers responded to a general evaluation questionnaire about captioned TV. Using the same 1-5 scale as was used in Objective 5 (1 = Poor, 5 = Excellent), the teachers again consistently rated the captioned TV lessons very highly. The teachers' general reactions to

captioned TV ranged from "good" to "excellent" (M = 4.33). The teachers' ratings of student motivation ranged from "very good" to "excellent" (M = 4.71), the ratings of the quality of the tapes for instruction ranged from "very good" to "excellent" (M = 4.14), and the ratings for the quality of the student learning ranged from "good" to "excellent" (M = 4.33).

When asked to identify their first and second choices for programs which were best suited for instruction using captioned TV, 3-2-1 Contact was identified most frequently (5), followed by Ripley's Believe It or Not (4), Scrappy Puppy (2), Sesame Street (2), and Different Strokes (1). When asked to identify the program segments which were least suited for instruction using captioned TV, five of the seven teachers identified the cartoon Scrappy Puppy.

It is interesting to note that after the first eight sessions using captioned TV (Objective 5), two of the seven teachers reported having some difficulty with the equipment. However, after the eight sessions conducted for Objective 6, none of the teachers reported experiencing difficulty with the TV or VCR.

With respect to the scripts of captions which were available for the captioned TV segments, all seven teachers reported making use of the scripts in the lessons they developed. On a three-point Likert Scale, teachers rated the value of the scripts (1 = Little Value, 2 = Some Value, and 3 = Very Valuable). Four of the seven teachers reported the scripts to be "very valuable" and three reported that they were of "some value".

Teachers were asked to respond to questions concerning the training which would be necessary in order for classroom teachers to become successful at using captioned TV for instructional purposes. All seven teachers reported that training would be necessary and identified the following areas as essential for training sessions with classroom teachers: (1) how to use the equipment, (2) how to use the handbook, and (3) how to use prepared lessons.

The teachers were also asked to indicate if captioned TV was suitable for the development of specific reading skills. All seven teachers reported that captioned TV was well suited to the development of vocabulary skills, six reported that it was suitable for the development of locating information, and five reported that captioned TV was suited to developing prediction skills. These teachers also suggested a variety of other skills for which captioned TV is well suited, such as character analysis and sequencing.

Observer Evaluations. Teachers' lessons were observed by trained researchers twice during either the second, fifth or eighth lesson. Observers used a checklist to record observed teacher and student behaviors and to note the time spent on various lessons components. A total of 14 lessons were observed.

The most frequently occurring objectives for the teachers' captioned television lessons were vocabulary (6), and prediction (4). The specific lesson components that were rated, and the percentage of time they were observed, is presented in Table 5.

It appears that teachers were able to develop and teach well-formed, purposeful captioned TV reading lessons.

TABLE 5

Observer Evaluations
of
Teacher Developed Captioned TV Lessons

Lesson Components	% of Time Teachers Were Observed Using Lesson Components
Lesson objectives were related to the development of reading skills	100%
There was a match between the teacher's stated objective and the observed lesson	100%
There were reading activities to develop the objectives	100%
Video captions were used in the lesson to develop reading skills	57%
Students used the paper scripts of captions for reading activities	79%
A purpose was set for viewing the captioned segment	85%
There was follow-up to the purposes set for viewing the captioned segment	92%

Instructional use of the video captions were as follows: students were instructed to identify specific words in the captions (7), students were instructed to read the captions (6), and students were instructed to find answers to questions in the captions (2). The teachers instructed the students to use the paper scripts of captions for the following purposes: identifying specific words (9), finding answers to questions (3), oral reading (3), and other uses (2).

The observers rated teacher and student behavior using a 1-5 scale (1 = No, 2 = A Little, 3 = 50/50, 4 = Mostly, 5 = Always). The observers reported that the teachers used the equipment easily (M = 4.36) and seemed comfortable with the lesson (M = 4.93). Observers also reported that students responded accurately (M = 3.79) and were on-task (M = 4.29). In addition, the observers rated the overall reading lessons and student interest using a Likert scale (1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, and 5 = Excellent). The overall evaluation of the reading lessons was "very good" (M = 4.07) and student interest was "very good" (M = 4.07).

The average lesson was approximately 32 minutes in length. Students spent an average of approximately 8.5 minutes viewing captioned television during each lesson. One half of the teachers had students re-watch portions of the video segment as part of the reading lesson. Students spent approximately 2.5 minutes engaged in this viewing activity.

Student Evaluations. The 45 students in the classrooms of the seven teachers who participated in Objectives 5 and 6 were asked to evaluate captioned television lessons. Students responded to the four questions in Table 6 using a Likert Scale (1 = Not at All, 2 = Very Little of the Time, 3 = Some of the Time, 4 = Most of the Time, 5 = All of the Time).

TABLE 6

Student Evaluations of Captioned TV Reading Lessons

		Mean	S.D.
1.	Did you like watching captioned TV Programs?	4.73	.58
2.	Did watching captioned TV help you learn words?	4.40	.91
3.	Did watching captioned TV make script reading easier?	4.09	1.12
4.	Would you like to learn with captioned TV again in school?	4.69	.92

The results of the student evaluation indicated that students were very positive about their experiences with captioned television and that they believed that it enhanced their learning.

The evaluations of the captioned TV lessons by the teachers, observers, and students indicated that teachers were effective in developing and teaching captioned TV reading lessons to learning disabled students. It is particularly noteworthy that both the teachers' and observers' evaluations were consistently high across all components of the captioned TV reading lessons. In addition, teacher and observer ratings were very positive with respect to student motivation. The data from the student evaluations also supports the high motivational quality of captioned TV reading lessons.

Research with Hearing-Impaired Students

Objective 7: To investigate the effects of captioned TV (with comprehension and vocabulary instruction) upon the reading performance of hearing-impaired students.

The purpose of this study was to systematically examine the effects of video and captions on the reading performance of hearing-impaired students who received vocabulary and comprehension instruction. Specifically, this study investigated whether there were differences between two treatment conditions with respect to students' sight vocabulary and comprehension. The two treatment conditions were 1) viewing TV with captions, and 2) reading the printed text of captions.

Subjects

Forty hearing-impaired students from the Tennessee School for the Deaf participated in this study. The students were reading on the first through third grade levels as determined by the comprehension subtest on the Stanford Achievement Test - Hearing Impaired Edition and at the fourth grade level or below on the Botel Word Opposites Test. They ranged in age from 9 to 15 and were reading at least one year below their grade level. The students' hearing loss ranged from severe to profound in the speech frequency range and, in most cases, the onset of deafness was before age two.

Materials

The video/text materials for this project consisted of six excerpts from the children's science TV program 3-2-1 Contact that had been identified in Objective 1 and used in Objectives 3 and 4. Since some students in this study would see TV programs and others would just read the program's text of captions, these materials had to be comprehensible to a reader who did not see the video action. Because of this restriction, only a limited range of programming could be selected. Two experienced reading teachers viewed video tapes of children's programs to identify meaningful segments that had captions which could be understood without the accompanying video. Forty-five segments were identified. These segments were then rated on a one to five scale in the categories of interest, educational value, and match between the content of captions and video action portrayed on the screen. Captions that were highly rated in all categories were then rated for comprehensibility and interest by a reading specialist who had not seen the videos.

The six video/text segments selected for use in this study had captions that were comprehensible when read without accompanying video or audio. They were similar in content (science), interest level, word count (about 200 words), reading level (3rd-7th), length of the video segment (1.5 to 3 minutes), and caption speed (107-122 wpm). In addition, six two to three minute segments were selected from cartoon programming, such as

Scrappy Puppy and The Littles. These high interest, meaningful segments were shown at the end of each session so students in all sessions could have the experience of watching a TV program.

Parallel lessons that focused on vocabulary and comprehension skills were developed for each of the six video segments (see samples in Appendix A). The lessons included 1) an introduction to the topic of the segment, 2) viewing or reading a segment, 3) vocabulary study, and 4) discussion of the content of the segment. The introduction included student discussion about their knowledge of the topic and teacher presentation of a few important facts about the topic (if they had not been introduced by the students). Two or three important content words or phrases were also introduced at this time. Students were then given a purpose for viewing or reading and then these purposes were discussed briefly after viewing or reading. Vocabulary study included introduction of three important content words, location of the words in the video or printed text of captions (script), and discussion of their meaning in context. A final summary activity included a brief discussion of the most interesting things they learned about the topic.

In addition to the lesson plans, written procedures for testing were developed to assure consistency across the two treatment conditions. Assessment materials were also developed for each of the sessions. A word recognition measure, consisting of 20 content vocabulary words selected from the text of captions, was created for each of the six segments.

Comprehension assessment measures were developed for the last four sessions. These measures contained eight true-false statements that required the student to read a statement and circle either true or false.

Procedures

The 40 students were randomly assigned by Botel Word Opposites reading level and grade placement to one of the following two treatment conditions: 1) captioned TV, or 2) text of captions. Two researchers who were experienced master teachers from the Tennessee School for the Deaf each worked with the two different treatment conditions. Students in each of the conditions met with the researcher six times over a four-week period for the treatment sessions. Researchers worked with groups of five or fewer students and each treatment session was approximately 40 minutes in length.

During the first phase of each session, students received vocabulary and comprehension instruction. This included an introduction to the topic to be viewed or read, discussion of key words, viewing or reading information on the topic, vocabulary study and discussion of the topic. Students in Condition 1 viewed a video segment with audio and captions; and students in Condition 2 read the printed copy of the video segment's captions.

After the instructional phase of each session, students were given a word recognition test. Sight word knowledge was assessed individually while the other members of the group worked on a

maze or drawing activity. Comprehension was assessed during the last four sessions with a true-false test. As the final activity for each session, students watched a short cartoon segment. This was done so that all subjects would have the experience of viewing a TV show at each session.

Results and Discussion

To verify the equivalence of the two treatment groups, t-test were performed on the Standard Achievement Test (SAT) and the Botel Word Opposites Test scores. No significant differences were found on either the SAT ($t = -.73$, $df = 38$, $p = .47$), or on the Botel scores ($t = .38$, $df = 38$, $p = .71$).

The word recognition and comprehension scores were analyzed with t-tests. The word recognition scores for the six sessions were analyzed in two different ways: by the total number of test words for the six sessions (120 words) and the number of words that were directly taught during the six sessions (31 words). While there were no significant differences found between the two conditions on the total test words, there were significant differences between the two conditions on words directly taught ($t = 2.83$, $df = 38$, $p < .007$). Scores for students in the captioned TV group ($M = 27.85$) were significantly higher than those in the text-of-captions group ($M = 24.7$).

Analysis of the four comprehension measures also revealed statistically significant differences between conditions ($t = 2.07$, $df = 38$, $p < .05$). Scores on the true-false tests for students in the captioned TV group ($M = 20.25$) were significantly higher than those in the text-of-captions group ($M = 18.45$).

The results of this study indicate that teacher-directed vocabulary and comprehension lessons using captioned TV enhance sight vocabulary and comprehension. It is important to note that in this study the time subjects were viewing captioned TV was relatively brief. The actual viewing or reading was based on 2-3 minute segments with one rereading or reviewing. In light of the very limited time of subject exposure and the positive findings in favor of captioned TV, it is clear that this medium deserves further attention from educators and reading researchers.

Objective 8: To investigate teachers' skill in using model captioned TV reading lessons with hearing-impaired students.

The purpose of this study was to examine whether teachers of hearing-impaired students could effectively use model captioned TV reading lessons. Specifically, teachers were trained to use captioned TV reading lessons and then they used eight prepared model TV lessons over a five-week period.

Subjects

Six teachers of hearing-impaired students who were reading below grade level served as subjects in this study. The 47 students ranged in age from 10 to 15 with reading levels from first to fourth grade. Their hearing loss was from severe to profound in the speech frequency range. All participants were from the Tennessee School for the Deaf, a residential school in Knoxville, Tennessee.

Materials

A series of four video packages were assembled for use in this study. Each package consisted of a captioned TV program, a printed text of the program's captions (script) for the teacher, and multiple copies of these printed scripts for use by the students. A set of eight model reading lessons, teacher evaluation and observation forms, as well as teacher training materials were also developed. All the materials used in this study were the same as those used in Objective 5.

Video Packages. Four captioned TV programs were selected from those identified in Objectives 1 and 2. Since teachers in previous research studies had successfully used a variety of program genres, three different types (science, cartoon, and situation comedies) were selected for use. They included two science segments from 3-2-1 Contact that had been used in Objectives 3 and 4, and two other programs, the cartoon Scrappy Puppy and the situation comedy Diff'rent Strokes, which had been successfully used in previous research studies (Koskinen, Wilson, & Jensema, 1986). The programs varied in length from a 2 minute program on termites to a complete 22 minute situation comedy. Also included in each video package were printed scripts of captions from the captioned TV program. A sufficient number of these scripts were included so each student in a group lesson would have their own copy.

Model Lessons. The eight model reading lessons, two per program, were 30 minutes in length and focused on vocabulary and comprehension skills (see samples in Appendix B). These lessons were developed so teachers would have experience in using

different types of programming to teach a variety of reading skills. The pair of lessons that were designed for each program related to each other and teachers were encouraged to use them within the same week. Each model lesson included the following parts:

- an introduction to the activity,
- viewing a captioned TV segment,
- reading skill instruction related to parts of the TV segment,
- use of the paper script of captions, and
- a brief activity to provide closure.

The eight lessons were developed to provide teachers with the opportunity to use captioned TV to teach the skills of vocabulary, locating information, character analysis, and prediction at least twice with students. In addition, because paper scripts of captions were used in each lesson, teachers had the opportunity to see how a variety of skills could be developed with these scripts.

Teacher Evaluation Forms. Two teacher evaluation forms were developed for use in this study. One form was used by the teachers to evaluate each of their eight lessons and the other, completed at the end of the study was a questionnaire comparing the types of lessons and evaluating captioned TV use in general (see Appendix C). The first evaluation form contained seven questions and a space for comments. Teachers were asked to use a five point Likert scale to answer questions related to whether she/he followed the lesson plan and was comfortable with the equipment. Teachers were also asked to evaluate the lesson and assess student interest, response accuracy, and whether they were on-task.

The 12-item general evaluation form consisted of questions related to teacher perceptions of student motivation and quality of learning. In addition, there were questions related to the type of training teachers received, the quality of lessons used, and their interest as well as skill in using captioned materials.

Observer Evaluation Forms. To determine whether the teachers were able to follow a prepared lesson, teachers were observed three times. Forms for the observers were developed for the second, fifth, and eighth lesson taught by each teacher. The three forms followed a similar structure, noting the lesson objective, the elements of the lesson, teacher use of equipment and teacher and student response to the lesson. (See sample in Appendix C). The interrater reliability among the two experienced observers who rated the teacher lessons ranged from .92 to 1 on the various parts of the lessons. A video tape of a lesson was used to obtain interrater reliability.

Teacher Training Procedures and Materials: Procedures for the initial two-hour training session, and a subsequent one-half hour session were adapted from those used in a previous study with hearing-impaired students (Koskinen, Wilson, & Jensema, 1986) and very similiar to those used in Objective 5. The first session included:

- an overview of the captioned TV research project,
- a presentation of a short TV segment with suggested ways it could be used to develop vocabulary and comprehension skills,

- a rationale for the use of captioned TV in the reading program, including the value of high interest material and the benefits of a video context as an aid to reading comprehension,

- modeling the parts of the first lesson teachers would be using with their students in the classroom,

- practice in using the video equipment, and

- a discussion of data collection procedures which included observation and their evaluation of their own lessons.

During the training teachers received a packet of materials for their subsequen use. It included a description of the research project, a published article describing previous research with captioned TV and reading, the first two model lessons, a description on how to use the video recorder with captioned tapes, and a set of eight lesson evaluation forms. The additional six lessons were given to the teachers as they completed the earlier ones.

An additional follow-up one-half hour training was conducted for teachers half-way through the project. This session was designed to provide a forum for sharing ideas, asking questions and discussing the benefits and concerns related to using captioned TV reading lessons. Questions were developed to start the discussion. They related to the first four lessons and included procedures for vocabulary development, locating information in the script, and character analysis.

Procedures

The teachers in the project were asked to use a sequenced set of eight prepared model captioned TV lessons as part of their reading program. To enable them to do this, teachers received a two-hour training session on using captioned TV in the teaching of reading. This session provided a rationale for using captioned TV,

discussed ways to use video segments in teaching reading, and modeled an actual lesson and use of the video equipment. Teachers also participated in a 30-minute follow-up session when they were approximately half-way through their set of lessons. This session provided teachers with an opportunity to ask questions and discuss the benefits and problems related to using captioned TV lessons.

Teachers taught the eight lessons over a five-week period to a group of hearing-impaired students. They used the lessons in a specified order and were asked to teach the pair of lessons that related to a specific TV program within one week. While teachers were asked to follow the general format of the lesson if possible, they were encouraged to adapt the plan if it was not appropriate for their students. Teachers evaluated each of their lessons after it was taught and then completed a general evaluation after the last lesson.

To assess teachers' ability to follow prepared lessons, teachers were observed teaching a captioned TV lesson three times. Observers, who were experienced teachers, observed and evaluated the teachers' second, fifth, and eighth lessons.

Results and Discussion

Descriptive procedures were used to analyze the data from the following sources: teachers' evaluations of each lesson, teachers' general evaluations, and observers' evaluations.

The six teachers in this study conducted eight captioned television lessons using model lesson plans based upon specific captioned television program segments. The teachers evaluated

each of the eight lessons. The teachers responded to four questions using a 5-point Likert Scale, 1 = Not at All, 3 = Some of the Time, and 5 = All of the Time (see Table 7). The teachers reported that they followed the lessons plans (M = 4.04), were comfortable with the equipment (M = 4.08), the students were on task (M = 4.04), and the students responded accurately during the lesson (M = 4.00).

TABLE 7

Teachers' Evaluation of Model Lessons 1-8

	Overall Average Means Across Lessons	S.D.
Followed Lesson Plan	4.04	.21
Comfortable with Equipment	4.08	.45
Students on Task	4.04	.32
Students Accurately Responded	4.00	.36
Student Interest	3.99	.37
Overall Evaluation of Lesson	3.52	.22
Overall Evaluation of Lesson Plan	3.57	.26

Using a 1-5 scale, the teachers rated student interest and their overall evaluation of the lessons and the lesson plans (1 = Poor, 5 = Excellent) (Table 7). The teachers' overall average ratings of student interest ranged from "good" to "excellent" (M = 3.99). The teacher's overall ratings of the lessons ranged from "good" to "very good" (M = 3.52), and the overall ratings of the lesson plans ranged from "good" to "very good" (M = 3.57).

Upon completion of the eight lessons, teachers responded to a general evaluation questionnaire about captioned TV. Using a Likert scale (1 Poor, 5 = Excellent), the teachers' general reaction to captioned TV ranged from "good" to "excellent" (M = 3.83). The teacher's ratings of student motivation ranged from "fair" to "excellent" (M = 3.83), the ratings for the quality of the tapes for instruction ranged from "good" to "excellent" (M = 3.83), and the ratings for the quality of student learning ranged from "good" to "very good" (M = 3.50).

When asked which TV reading lessons were best for developing reading skills (by indicating their first and second choice) the responses were the 3-2-1 Contact segment "Termites," Scrappy Puppy (cartoon). The teachers reported that the students also liked the 3-2-1 Contact segment "Termites" and Scrappy Puppy best.

Five of the six teachers reported that even if they were not involved in a research project they would probably use captioned TV in their classrooms on the average of once of twice a week. A majority (4) found the scripts to be useful in the lessons. Four of the six teachers reported that they experienced some difficulty using the TV and the VCR equipment. Five teachers noted that the training they received was sufficient to enable them to use the prepared captioned TV lessons successfully.

In order to determine whether teachers were following the instructional models which had been presented for using captioned television, the 2nd, 5th, and 8th lessons for each teacher were rated by trained observers. The observers rated each lesson on

1) following the lesson plan, 2) use of equipment, 3) comfort with the lesson, 4) student responses, 5) student on task behavior. A Likert scale was used (1 = No, 2 = A Little, 3 = 50/50, 4 = Mostly, 5 = Always). The observers also evaluated student interest using a 1-5 scale (1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, 5 = Excellent). In addition, the observers recorded the length of each lesson. The ratings of the observers concerning all aspects of the observed lessons were high (see Table 8). The observers overall rating for the lessons were "very good" (M = 4.55) and student interest was also rated as "very good" (M = 4.69). The average lesson was approximately 42 minutes in length.

TABLE 8

Observers' Evaluation of Lessons 2, 5, and 8

	Overall Average Means Across Lessons	S.D.
Followed Lesson Plan	4.76	.18
Used Equipment Easily	4.39	.54
Comfort with Lesson	4.69	.20
Students Responded Accurately	4.82	.17
Students were on-task	4.70	.18
Overall Lesson Evaluation	4.55	.15
Student Interest	4.69	.27
Lesson Time	41.68	.62

The findings of this study revealed that teachers were able to effectively use model captioned TV reading lessons with learning disabled students. Both the teachers' self-reported evaluations and the evaluations of the trained observers indicated that the teachers' lessons were of high quality and that student motivation and on-task behavior were high.

Objective 9: To investigate teachers' skill in developing and teaching captioned TV reading lessons to hearing-impaired students.

In this study teachers' skill in creating and using their own captioned TV lessons was examined. Teachers who had already used prepared captioned TV reading lessons were provided with training on how to develop their own lessons. They were then asked to develop and teach eight lessons that would be appropriate for their hearing-impaired students.

Students

The six teachers and their 47 students from Objective 8 participated in this study. They began the training and teaching activities of this study approximately a week after completing the activities for Objective 8.

Materials

Ten video packages, each containing a captioned program and scripts were assembled for use in this study. In addition, a teacher's guide, teacher evaluation and observation forms, as well as a student questionnaire were developed. All the materials were exactly the same as those used in Objective 6.

Video Packages. Ten complete captioned programs were selected for use from those identified in Objectives 1 and 2 (see Appendix D). They included three 3-2-1 Contact science programs, Ripley's Believe It or Not, (a general information program) and Sesame Street (a children's program). All of these programs were one hour in length. Three cartoons, The Littles, Scooby Doo and

Scrappy Puppy, and two Diff'rent Strokes situation comedies were also selected. These programs ranged in length from 12 to 22 minutes. Also included in each video package were scripts of captions for every student in the reading group.

Teacher's Guide. A teacher's guide was written so teachers would have resource material to refer to when they began preparing their own lessons. The guide contained an introduction to the idea of using captioned TV, a section that provided an overview of using captioned TV in reading instruction, and a section that detailed ideas for getting started. This final section included the following topics:

- getting to know your equipment,
- planning captioned TV lessons which involves selecting and previewing programs, determining reading skills and writing a lesson plan,
- using captioned TV lesson in the classroom.

(The teacher's guide Have You Read Any Good TV Lately? contains all the revisions and additions made as a result of the entire DOE project. Parts 1, 2 and 3 were given to the teachers in this study.)

Teacher Evaluation Forms. Two teacher evaluation forms similar in structure and purpose to those used in Objective 8 were developed for this study (see Appendix E). The first form was used by teachers to evaluate each of their lessons. It contained a space for teachers to briefly describe their lesson and six questions that were used on the Objective 8 evaluation form. The 13-item general evaluation form related to teacher perceptions of student motivation and quality of learning. In

addition, there were questions related to the type of training teachers received, the quality of lessons used, and their interest as well as skill in using captioned materials.

Observer Evaulation Form. To determine whether the teachers were able to develop and teach their own captioned TV reading lessons, teachers were observed three times. The form developed asked the observer to determine the lesson objective, note reading activities related to the objective, and the way the video captions and script of captions were used (see Appendix E). In addition, questions from the observer form used in Objective 8 related to teacher use of equipment, and teacher and student responses to the lesson also were included.

Student Questionnaire. A four-item questionnaire (see Appendix E) was developed to assess student interest in captioned TV reading lessons. On a five-point Likert scale ranging from "Not at All" to "All of the Time", students were asked questions related to how they liked viewing captioned TV and whether it helped them learn to read.

Procedures

The six teachers in this project were asked to develop and teach eight captioned TV reading lessons as part of their reading program. These lessons were to be approximately 30 minutes in length and focus on skills that were appropriate for their hearing-impaired students. To provide assistance in lesson development, teachers participated in an initial 90 minute training session and then in a

30 minute follow-up meeting. To provide continuity, the initial training was conducted by the first author who had worked with the teachers during Objective 8.

Procedures for training were adapted from those used in a previous study (Koskinen, Wilson, & Jensema, 1986) and similar to those used in Objective 6. The initial session focused on different aspects of planning captioned TV reading lessons. Since the teachers had already used prepared lessons, this session began with a discussion of the types of reading skills and video segments they had used successfully. Teachers were given the teacher's guide and the following aspects of lesson planning were discussed in light of their previous experience with prepared lessons:

- selecting high interest programs.
- previewing TV programs,
- determining reading skills, and
- writing a lesson plan.

A follow-up training was conducted for teachers one-half way through the project. This session was a discussion session similar to the one held during Objective 8. It provided a forum for sharing ideas, asking questions, and discussing the benefits and concerns related to using captioned TV

Teachers developed and taught eight lessons over a five-week period to a group of hearing-impaired students. They were provided with ten complete video programs which were similar to those they had previously used. The video materials included cartoons, situation comedies and science programs. Teachers were

encouraged to use any of the segments from the available TV programs, but were asked not to use a program segment more than four times. This was requested so the teachers would have the experience of selecting and using more than one segment. While teachers had been exposed to a model in Objective 8 of using two lessons per program or meaningful segment, they were not required to follow that format. Teachers evaluated each of their lessons after it was taught, and completed a general evaluation after the last session. In addition, they asked students to evaluate captioned TV by completing a short questionnaire which was read to them.

To assess teachers' ability to create and teach their own captioned TV reading lessons, teachers were observed three times, during the second, fifth, or eighth lesson. The experienced teachers who were observers in Objective 8 also served as observers in this study.

Results and Discussion

Descriptive procedures were used to analyze the data obtained from the following sources: teachers' evaluations of each lesson, teachers' general evaluations, observers' evaluations, and students' evaluations.

Teacher Evaluations The six teachers in this study conducted eight captioned TV lessons using lessons which they developed based upon program segments of their choice. They evaluated each of the eight lessons. The teachers responded to four questions using a 5-point Likert Scale, 1 = Not at All, 3 = Some of the Time, and 5 = All of the Time (see Table 9).

The teachers reported that they followed their lessons plans (M = 4.15), were comfortable with the equipment (M = 4.27), the students were on task (M = 3.94), and the students responded accurately during the lesson (M = 3.92).

TABLE 9

Teacher Evaluation of Their Own Lessons 1-8

	Overall Average Means Across Lessons	S.D.
Followed Lesson Plan	4.15	.19
Comfortable with Equipment	4.27	.23
Students on Task	3.94	.38
Students Accurately Responded	3.92	.28
Student Interest	3.79	.53
Overall Evaluation of Lesson	3.65	.40

Using a 1-5 scale, the teachers rated student interest and their overall evaluation of the lessons (1 = Poor, 5 = Excellent). The teachers' ratings of student interest ranged from "good" to "excellent" (M = 3.79). The teacher's overall ratings of the lessons ranged from "good" to "excellent" (M = 3.65).

Upon completion of the eight lessons, teachers responded to a general evaluation questionnaire about captioned TV. Using the same 1-5 scale as was used in Objective 8 (1 = Poor, 5 = Excellent) the teachers again had a positive response to captioned TV lessons. The teachers' general reactions to captioned TV ranged from "good" to "excellent" (M = 3.67). The teachers' ratings of student motivation ranged from "good" to "very good" (M = 3.50), the ratings of the quality of the tapes for instruction ranged from "fair" to "very good" (M = 3.00), and

the ratings for the quality of the student learning ranged from "fair" to "very good" (M = 3.50).

When teachers were asked to identify their first and second choices for programs which were best suited for instruction using captioned TV, Ripleys Believe It or Not was identified most frequently (3), followed by 3-2-1 Contact (3), Scrappy Puppy (1) and Diff'rent Strokes (1). When asked to identify the program segments which were least suited for instruction using captioned TV, two of the six teachers identified Sesame Street.

It is interesting to note that after the first eight sessions using captioned TV (Objective 8), four of the six teachers reported having some difficulty with the equipment. However, after the eight sessions conducted for Objective 9, only two of the teachers reported experiencing difficulty with the TV or VCR.

With respect to the scripts of captions which were available for the captioned TV segments, all six teachers reported making use of the scripts in the lessons they developed. On a three-point Likert Scale, teachers rated the value of the scripts (1 = Little Value, 2 = Some Value, and 3 = Very Valuable). Five of the six teachers reported the scripts to be of "some value" and one teacher reported that the scripts were of "little value".

Teachers were asked to respond to questions concerning the training which would be necessary in order for classroom teachers to become successful at using captioned TV for instructional purposes. Five of the six teachers reported that training would be necessary and identified the following areas as essential for

training sessions with classroom teachers: (1) how to use equipment, (2) how to use the handbook, and (3) how to use prepared lessons.

The teachers were also asked to indicate if captioned TV was suitable for the development of specific reading skills. All six teachers reported that captioned TV was well suited to the development of vocabulary skills and locating information. Five teachers reported that captioned TV was suited to developing prediction skills. These teachers also suggested a variety of other skills for which captioned TV is well suited, such as character analysis and sequencing.

Observer Evaluations. Lessons 2, 5, and 8 were observed by trained researchers who used a checklist to record observed teacher and student behaviors and to note the time spent on various lesson components. A total of 18 lessons were observed.

The most frequently occurring objectives for the teachers' captioned television lessons were vocabulary (12), locating information (6), and prediction (4). The specific lesson components that were rated and the percentage of time they were observed is presented in Table 10. It appears that teachers were able to develop and teach well-formed purposeful captioned TV reading lessons.

TABLE 10

Observer Evaluations
of
Teacher Developed Captioned TV Lessons

Lesson Components	% of Time Teachers Were Observed Using Lesson Components
Lesson objectives were related to the development of reading skills	100%
There was a match between the teacher's stated objective and the observed lesson	94%
There were reading activities to develop the objectives	94%
Video captions were used in the lesson to develop reading skills	100%
Students used the paper scripts of captions for reading activities	78%
A purpose was set for viewing the captioned segment	94%
There was follow-up to the purposes set for viewing the captioned segment	94%

Instructional use of the video captions were as follows: students were instructed to read the captions (13), students were instructed to find answers to questions in the captions (10), students were instructed to identify specific words in the captions (8) and, other uses (5). The teachers instructed the students to use the paper scripts of captions for the following purposes: identifying specific words (8), finding answers to questions (6), finding phrases (1) and, other uses (3).

Observers rated teacher and student behavior using a 1-5 scale (1 = No, 2 = A Little, 3 = 50/50, 4 = Mostly, 5 = Always).

The observers reported that teachers used the equipment easily (M = 4.67) and seemed comfortable with the lesson (M = 4.94). Observers also reported that students responded accurately (M = 4.89) and were on-task (M = 4.78). In addition, the observers rated the overall reading lesson and student interest using a 1-5 scale (1 = Poor, 2 = Fair, 3 = Good, 4 = Very Good, and 5 = Excellent). The overall evaluation of the reading lessons was "very good" (M = 4.56) and student interest was "very good" (M = 4.61).

The average lesson was approximately 36 minutes in length. During the lessons students spent an average of approximately 5.5 minutes viewing captioned television during each lesson. They spent approximately 2 minutes of each lesson re-watching parts of the video segment as a part of the reading lesson.

Student Evaluation. The 47 students in the classrooms of the six teachers who participated in Objectives 8 and 9 were asked to evaluate captioned television lessons. Students responded to the four questions in Table 11 using a Likert Scale (1 = Not at All, 2 = Very Little of the Time, 3 = Some of the Time, 4 = Most of the Time, 5 = All of the Time).

TABLE 11

Student Evaluations of Captioned TV Reading Lessons

		Mean	S.D.
1.	Did you like watching captioned TV programs?	3.98	1.33
2.	Did watching captioned TV help you learn words?	3.91	1.21
3.	Did watching captioned TV make script reading easier?	2.81	1.56
4.	Would you like to learn with captioned TV again in school?	3.34	1.55

The results of the student evaluation indicate that students were positive about their experiences with captioned television. They reported that they enjoyed watching captioned TV programs and that watching captioned TV helped them learn words.

The evaluations of the captioned TV lessons by the teachers, observers, and students indicated that teachers were effective in developing and teaching captioned TV reading lessons to hearing-impaired students. It is particularly noteworthy that both the teachers' and observers' evaluations were consistently high across all components of the captioned TV reading lessons. In addition, teachers and observer ratings were very positive with respect to student motivation. The data from the student evaluations also supports the motivational quality of captioned TV reading lessons.

Research Summary and Conclusions

The primary goal of this project was to investigate the use of captioned television technology to improve the reading skills of two handicapped populations: learning disabled and hearing-impaired students. To accomplish this goal, two studies for material development and seven major studies investigating captioned television were conducted. These studies examined the effects of captioned television upon student reading performance and explored teachers' skill in using captioned TV lessons as part of classroom reading instruction.

The first two studies focused upon the identification of appropriate program materials to be used in the seven major studies. The first investigation (Objective 1) dealt with determining the readability of available captioned program suitable for use with students, while the second study (Objective 2) focused upon determining whether the readability level of the captions corresponded to student success in reading captions.

Three studies were undertaken to systematically investigate the effects of captioned TV viewing on the vocabulary and comprehension skills of both hearing and hearing-impaired students. Two studies (Objectives 3 and 4) were conducted with hearing students who were learning disabled remedial readers. Objective 3 examined the effects of video, audio, and captions on students who received no instruction, while Objective 4 investigated these effects when students received related vocabulary and comprehension instruction. In both studies,

students in the group viewing captioned TV with sound did significantly better on sight vocabulary measures than students reading only the text of captions. Other results suggest that both captioned TV with sound and conventional TV are well worth exploring as a media for enhancing the reading skills of learning disabled students.

A third study (Objective 7) that was similar in purpose and design to Objective 4, was conducted with hearing-impaired students. Results revealed that students who received captioned TV reading lessons had significantly higher vocabulary and comprehension scores than those who received instruction related to just the text of captions.

Four studies were conducted with teachers of learning disabled and hearing-impaired students. Objectives 5 and 8 explored teachers' skill in using model captioned TV reading lessons, while Objectives 6 and 9 investigated teachers skill in developing and teaching captioned TV reading lessons. Results from these studies indicated that teachers with a minimum of training could effectively use prepared model lessons. Teachers also could develop their own well structured captioned TV lessons and were enthusiastic about their use in the teaching of a variety reading skills.

Captioned television is an exciting technology which has considerable educational potential for students who have been difficult to reach with traditional materials and methods. The results of the project's research studies indicates that

captioned TV is a powerful medium that captures students' interest and can be effectively used in classroom reading instruction. The findings from the study with learning disabled students who viewed captioned TV, but did not receive accompanying instruction, also indicate that captioned TV has positive benefits for incidental learning of reading skills. Given the number of captioned programs available (130 per week) and the amount of time that people spend viewing TV, future research should explore the potential of using captioned TV for developing and enhancing reading skills in both the home and school environment.

Further research needs to systematically investigate the effects of captioned TV on student achievement when captioned TV is used over extended periods of time, with materials of varying lengths, and as part of directed reading/language instruction. The benefits of using a variety of high interest programming, such as cartoons with young children and serial dramas with adolescents and adults, should be included in future research efforts. In addition, there is a need to explore the use of captioned TV with other types of learners, including pre-school children, adult beginning readers, and individuals who speak English as a second language.

Dissemination

Objective 10: To disseminate the research results and the teacher training guide.

Because there has been limited use of closed-captioning technology in education, dissemination of information relating to its potential uses is considered essential in a creating widespread impact. Consequently, general information about the project, its goals, methodology and results were disseminated through many channels at different points in the project. Research results have been presented at professional conferences and articles were published in educational journals on these topics. In addition, a teacher's guide was developed and a promotional brochure was distributed to provide information about using captioned TV in the teaching of reading.

Both the classroom aspects of the project and the research results have been presented at a variety of state and national professional conferences. Project consultants have made presentations related to captioned TV research at the following professional meetings:

College Reading Association, Washington, D.C., 1984
Eastern Regional International Reading Association, Baltimore, Maryland, 1985
National Reading Conference, San Diego, California, 1985
Diamond State Reading Association, Dover, Delaware, 1985

Connecticut State Academy of Family Physicians, Stamford, Connecticut, 1986

State of Maryland International Reading Association, Gaithersburg, Maryland, 1986 (Following the presentation, the NCI and Drs. Koskinen and Wilson received the State of Maryland International Reading Association's Literacy Award for their research with captioned TV and reading.)

International Reading Association, Philadelphia, Pennsylvania, 1986

Conference on Reading Research, sponsored by the Center for the Study of Reading at the University of Illinois, Philadelphia, Pennsylvania, 1986

National Reading Conference, Austin, Texas, 1986

U.S. Department of Education Conference on Captioning, Washington, D.C., 1986

Southern Maryland Reading Conference, St. Mary's County, Maryland, 1987

Presentations will be made in March at the American Educational Research Association Conference Washington, D.C., the Eastern Tennessee Educational Conference in Knoxville, Tennessee, and in April at the Maryland Educational Media Organization in Annapolis, Maryland. Papers have also been submitted to the Convention of America Instructors of the Deaf and the Council for Exceptional Children.

Articles about research results have already been published in two research journals: National Reading Conference Yearbook and ERS Spectrum: Journal of School Research and Information. Five other manuscripts are being prepared for the Journal of Learning Disabilities, American Annals of the Deaf, Perspecitves, Reading Teacher, and Teaching Exceptional Children. The National Captioning Institute will be publishing two of these articles as research reports. Other articles, which mentioned the research in progress, appeared in the International Reading Association's newspaper Reading Today (1985) that reaches 20,000 people

internationally, Exceptional Parent (1986), the National Captioning Institute's newsletter (Fall, 1986) that has a circulation of 1/2 million, and Education of the Handicapped (1987). In addition, letters describing the findings with hearing-impaired students (Objective 7) were sent to 1300 members of the American Society for Deaf Children and 1200 members of International Parent Organization.

A 55 page teacher's guide Have You Read Any Good TV Lately? was developed to provide information on using captioned TV in the teaching of reading and language skills. It includes:

- a rationale using captioned TV in the teaching of reading
- guidelines for using the video equipment,
- general procedures for getting started,
- an overview of captioned TV research with various types of learners
- questions frequently asked by teachers
- sample captioned TV reading lessons

To inform educators of the potential of using captioned TV in the teaching of reading and the availability of the teacher's guide, an informational brochure was developed. It includes pictures of captioned TV programs, information about video equipment and captioned TV programs, sample TV reading activities, and ideas for getting started. In addition, it refers to the teacher's guide, providing information on cost and availability.

A major strategy for disseminating the teacher's guide was to identify populations for whom the guide would be most valuable. Groups such as special educators in public and private schools, and college and university special

education teacher trainers were targeted. Approximately 4,500 brochures were sent by direct mail to these educators by using mailing lists from the Division of Teacher Educators of the Council for Exceptional Children, the College Reading Association, and Gallaudet University's list of schools with programs for hearing-impaired students. An additional 500 are being distributed at professional conferences and upon request at the National Captioning Institute.

REFERENCES

Adler, R. (1985). Using closed-captioned television in the classroom. In L. Gambrell & E. McLaughlin (Eds.), New Directions in Reading: Research and Practice. Yearbook of the State of Maryland International Reading Association, 11-18.

Boyd, J. & Vader, E. A. (1972). Captioned television for the deaf, American Annals of the Deaf, 117, 34-37.

Brown, A., Campoine, J., & Day, J. (1981). Learning to learn: on training students to learn from texts. Educational Researcher, 10 (2), 14-21.

Capelli, C. A. & Markman, E. M. (1982). Suggestions for training comprehension monitoring. Topics in Learning and Learning Disabled, 2, 87-96.

Fetler, M. (1984). Television viewing and school achievement. Journal of Communication, 34, 104-118.

Fischer, D. C. (1971). Improvement in the utilization of captioned films for the deaf (Doctoral dissertation, University of Nebraska, 1971). Dissertation Abstracts International, 32, 693A. University Microfilms No. T1-19842.

Jackson, W., & Perkins, R. (1974). Television for deaf learners: A utilization quandary. American Annals of the Deaf, 119, 537-548.

Koskinen, P. S., Wilson, R. M., & Jensema, C. J. (1985). Closed-captioned television: A new tool for reading instruction. Reading World, 24, 1-7.

Koskinen, P. S., Wilson, R. M., & Jensema, C. J. (1986). Using closed captioned television in the teaching of reading to deaf students. American Annals of the Deaf, 131, 43-46.

Liss, M. B. & Price, D. (1981). What, when, and why deaf children watch television. American Annals of the Deaf, 126, 493-498.

Loper, A. B. & Hallahan, D. H. (1982). A consideration of the role of generalization in cognitive training. Topics in Learning and Learning Disabled, 2, 68-78.

Mason, G. E., Blanchard, J. S., & Daniel, D. B. (1983). Computer Applications in Reading, Newark, Delaware: International National Reading Association.

Morgan, M., & Gross, L. (1982). Television and educational achievement. In Ten Years of Scientific Progress and Implications for the Eighties, Vol. 2. Rockville, MD: Department of Health and Human Services, National Institute of Mental Health.

National Assessment of Educational Progress. Procedural Handbook: 1979-80 Reading and Literature Assessment. Denver, CO: Education Commission of the States, 1981.

National Captioning Institute. (1981). A survey of closed-captioned television use in schools for the hearing-impaired. Research Report 81-11. Falls Church, Virginia: National Captioning Institute.

National Captioning Institute. (1983). Hearing-impaired children's comprehension of closed-captioned television programs. Research Report 83-5. Falls Church, Virginia: National Captioning Institute.

National Health Interview Survey of the National Center for Health Statistics. (1982).

Nix, G. W. (1972). The effects of synchronized captioning on the assimilation of vocabulary and concept presented in a film to intermediate level deaf children (Doctoral dissertation, University of Oregon, 1971). Dissertation Abstracts International, 32, 5074A. University Microfilms No. 72-8584.

Norwood, M. J. (1976). Comparison of an interpreted and captioned newscast among deaf high school graduates and deaf college graduates. Unpublished doctoral dissertation, University of Maryland.

Previty, J. H. (1984). Cable television: An aid to education. Technology Horizons in Education, 11.

Propp, G. (1972). An experimental study on the encoding of verbal information for visual transmission to the hearing-impaired learner. Unpublished doctoral dissertation, University of Nebraska.

Reinking, D., & Schreiner, R. (1985). The effects of computer-mediated text on measures of reading comprehension and reading behavior. Reading Research Quarterly, 20, 536-552.

Rubin, A. (1982). The new media: Potential uses and impact of the new technologies for children's learning. Educational Technology, 22, 5-9.

Sendelbaugh, J. W. (1978). Television viewing habits of hearing-impaired teenagers in the Chicago metropolitan area. American Annals of the Deaf, 123, 536-541.

Williams, P. ., Haertel, E. H., Haertel, G. D., & Walbert, H. J. (1982). The impact of leisure time television on school learning: A research synthesis. American Educational Research Journal, 19, 19-50.

APPENDIX A

Sample Researcher Lessons
for
Objectives 4 and 7

SAMPLE RESEARCHER
LESSON WITH TV

Closed-Captioned Television with Sound Condition

RECORD STARTING TIME _____

I. Introduction

Hi. Today we will be doing some of the same kinds of things we did last time. We will be watching parts of some TV shows and reading some of the words and talking about a TV show. You all really worked so well at our last session and did a fine job. That was just great!

II. Captioned TV with Sound Activity

PUT WORDS "termites" AND "Alate termite colonies" ON THE BOARD OR ON TAG BOARD SO STUDENTS CAN SEE THEM.

(Viewing Introduction- 3 minutes.)

Today we will watch a 3-2-1 Contact program about how new termite colonies are built. (point to word "termite"). We will learn about the inside and the outside of Alate termite colonies. (point to word on board)

Tell me what you know about how insects, such as the ant, termite and bee, build their colonies. (Accept any responses--Bring out that these insects have homes with many rooms or chambers--some have tunnels between rooms.)

In this two minute captioned program that we will watch, each young termite king finds a young termite queen so that they can start their own termite colony. These young termite kings and queens are called Alates. They must leave home to build a new termite colony. Watch this program carefully and read the captions as you watch so you can describe the inside and outside of a termite colony.

(Viewing - 2 1/2 minutes.)
BEGIN 3-2-1 CONTACT #236 COUNTER AT ____ AND END AT____ (see script)

(Follow up on purposes- 1 1/2 minutes.)

Tell me what you learned about the inside and the outside of an Alate termite colony.

(Accept student resonses--Be sure to mention that there are many types of termites, (kings, queens, workers, and soldiers) and they have different jobs--the queen lays the eggs and the workers bring in the food.)

REWIND TAPE TO BEGINNING OF VIGNETTE

(Vocabulary - 3 minutes.)

Here's the word mound (write the word on board or put it on tag board so students can see it.)

Let's look for the word mound on the screen. See if you can figure out what the word mound means. Raise your hand when you see the word mound.

BEGIN TAPE AT THE BEGINNING OF VIGNETTE (When students find the word, stop the tape at the end of the sentence in which the word appears.)

What does the word mound mean here?

REPEAT ABOVE VOCABULARY PROCEDURE TWO MORE TIMES, SUBSTITUTING THE WORDS CHAMBER AND NURSERIES FOR THE WORD MOUND.

(Summary - 1 min.)

We learned a lot about termites. What was the most interesting thing you learned about the Alate termite colonies.

(Accept student responses.)

SAMPLE RESEARCHER LESSON
WITH TEXT OF CAPTIONS (SCRIPT)

Text of Captions (Script) Reading Condition

RECORD STARTING TIME _____

I. Introduction

Hi. Today we will be doing some of the same kinds of things we did last time. We will be watching part of a TV show, reading captions and reading some of the words and talking about the script we read. You all really worked so well at our last session and did a fine job. That was just great!

II. Script Reading Activity

PUT WORDS "termites" AND "Alate termite colonies" ON THE BOARD OR ON TAG BOARD SO STUDENTS CAN SEE THEM.

(Reading Introduction- 3 minutes.)

Today we will read a script of captions from a 3-2-1 Contact program about how new termite colonies are built. (point to word "termite"). We will learn about the inside and the outside of Alate termite colonies (point to words on the board)

Tell me what you know about how insects, such as the ant, termite and bee, build their colonies. (Accept any responses--Bring out that these insects have homes with many rooms or chambers--some have tunnels between rooms.)

PASS OUT SCRIPTS ON TERMITE COLONIES

In this script that we are going to read, each young termite king finds a young termite queen so that they can start their own termite colony. These young termite kings and queens are called Alates. They must leave home to build a new termite colony. Take about 2 minutes to read this script silently. Read this script carefully so you can describe the inside and outside of a termite colony. You may begin reading now.

(Reading - Approximately 2 1/2 minutes.)

ASK STUDENT TO STOP READING AFTER 2 MINUTES AND 13 SECONDS BY SAYING

Please stop reading now and turn your scripts over for a minute.

(Follow up on purposes- 1 1/2 minutes.)

Tell me what you learned about the inside and the outside of an Alate termite colony.

(Accept student responses- Be sure to mention that there are many types of termites, (kings, queens, workers, and soliders)

and they have different jobs--the queen lays the eggs and the workers bring in the food.)

REWIND TAPE TO BEGINNING OF VIGNETTE

(Vocabulary - 3 minutes.)

Here's the word mound (write the word on board or put it on tag board so students can see it.)

Let's look for the word mound in the scripts. See if you can figure out what the word mound means. Raise you hand when you find the word mound.

WHEN STUDENTS FIND THE WORD, SAY

What does the word mound mean here?

REPEAT ABOVE VOCABULARY PROCEDURE TWO MORE TIMES, SUBSTITUTING THE WORDS CHAMBER AND NURSERIES FOR THE WORD MOUND.

(Summary - 1 min.)

We learned a lot about termites. What was the most interesting thing you learned about the Alate termite colonies.

(Accept student responses.)

TERMITE COLONIES

ONCE A YEAR IN AFRICA,

THE ALATES LEAVE HOME
TO START NEW TERMITE COLONIES.

THE ALATES ARE
THE YOUNG KINGS AND QUEENS.

WHEN THEY FIND A MATE,
THEY DIG DOWN TO BUILD A NEST.

EACH MOUND WILL HOUSE
MILLIONS OF TERMITES.

THE KING AND QUEEN
NEVER LEAVE THEIR CHAMBER.

THE WORKERS BRING IN FOOD.

BESIDES THE KING AND QUEEN,

THERE ARE
SOLDIERS AND WORKERS.

SCIENTISTS THINK THAT
CHEMICALS IN THE QUEEN'S FOOD

TELL HER
WHAT'S HAPPENING OUTSIDE.

IF THE ALATES NEED MORE SOLDIERS,

THE QUEEN LAYS EGGS
THAT HATCH SOLDIERS.

IF THEY NEED WORKERS,
SHE MAKES WORKERS.

THE EGGS HATCH IN NURSERIES
ABOVE THE QUEEN.

THAT IS WHERE
BABY TERMITES ARE FED

UNTIL THEY'RE READY TO WORK.

THE TERMITES
COVER PLANTS WITH MUD

SO THEY CAN FEED SAFELY.

IN THE MOUND,

THE TERMITES BUILD GARDENS
WITH CHEWED PLANTS

AND GROW MUSHROOMS TO EAT.

TO KEEP THE NEST
FROM GETTING TO HOT,

THE TERMITES BUILD TUNNELS
THAT LET COOL AIR BLOW IN

AND WARM AIR BLOW OUT.

FROM THE OUTSIDE,

THE TERMITE MOUNDS LOOK
LIKE DESERTED CLAY SKYSCRAPERS.

BUT INSIDE ARE MILLIONS
OF TERMITES,

LIVING AND BUILDING
THE WAY THEY HAVE
FOR 200 MILLION YEARS.

APPENDIX B

Sample Model Lessons
for
Objectives 5 and 8

Lesson 1
3-2-1 Contact #212
"Flight Tuesday"
Script pp. 8-19
(12 min.)

"Parachuting"

Objective: Vocabulary Development

1. Building Background/Purpose setting (3-5 mins.)

PUT WORDS "parachute", "parachute equipment" AND "gear" ON THE BOARD OR ON TAG BOARD.

Tell students that they are going to watch a short program on how to make a parachute jump (point to the word "parachute"). Tell them that they will also be learning about parachute equipment or gear that people need when they jump (point to words on the board).

Build background information about the program by asking about parachutes, such as saying,

"What do you know about parachutes?" (Accept responses - Bring out that a parachute is made of fabric, looks like an umbrella and it slows your fall from an airplane.)

In addition, you might ask,

"What do you think you would need to wear if you were going to be jumping from an airplane?" (Accept responses)

Provide a short introduction to the program and set purposes for viewing. For example you might say, "In this program Ellen Jeffries is a teacher at the Connecticut Parachuters Club. She trains people to use a parachute as they jump from an airplane. She is going to teach a girl named Tina to jump with a parachute. Watch this program carefully and read the captions as you watch, so you can describe what you need to know about making a parachute jump. (You may want to put the purpose for viewing on the board -- such as "Describe what you need to know about making a parachute jump.")

2. Program Viewing (12 mins.)

BEGIN THE 3-2-1 CONTACT #212 "parachuting" SEGMENT (see script pp. 8-19) AT "That's Ellen Jeffries up there." (p. 8) AND END AFTER "Wait till I show everybody!" (p. 19)

REWIND TAPE TO BEGINNING OF THE PARACHUTING SEGMENT

3. Follow up on Purposes (2-3 mins.)

Ask students about the purposes you set, such as: "If you want to make a parachute jump, what would you need to know?"

(Accept student responses - You may want to mention that you need two types of parachutes, a helmet to protect your head, how to get out of the plane, etc.)

4. Finding Words on the Video Tape (4-5 mins.)

Select 5 words that are visually portrayed in the video, such as:

gear (p. 9)	door (p. 10)	swing (p. 10)
jump s.it (p. 9)	head (p. 10)	push (p. 10)
bulky (p. 9)	sit (p. 10)	leg (p. 10)

Tell students they are going to look for interesting words in the program. For example you could say:

"Here's the word gear." (write the word on board or put on tag board so students can see it.)

"Let's look for the word gear on the screen. See if you can figure out what the word gear means. Raise your hand when you see the word gear."

BEGIN TAPE AT THE BEGINNING OF THE SEGMENT (When students find the word, stop the tape at the end of the sentence in which the word appears.)

"What does the word gear mean here?"

Repeat the above vocabulary procedure about 4 more times with words you have selected that are portrayed visually in the program. Be sure to list words on the board in the order they appear in the video tape.

5. Finding Words in the Script (2-3 mins.)

PASS OUT SCRIPTS

Tell students they will now be looking for the same words in the script that they found on the TV screen. Introduce the words one at a time as they appear in the script and tell the students the page on which the word appears. For example you might say, "Here is the word "gear." (Point to the word "gear" on the board.) Look for the word "gear" in the script on page 9. Raise your hand when you find it." Have a student read the whole sentence in which the word appears (only if you think the student can be successful with this reading). Repeat this procedure with the other 4 words.

6. Choice of Favorite Part (2-3 mins.)

To provide closure for this lesson, ask students what parts of the program they liked best and why. After students have had an opportunity to tell a favorite part, tell them that next time they do TV reading they'll get to see some of those favorite parts again.

Lesson 2
3-2-1 Contact #212
"Flight Tuesday"
Script pp. 8-19

"Parachuting"

Objective: Locating Information

1. Locating Information in the Video Segment (5-8 mins.)

Remind students of the interesting parts they liked in the "Parachuting" program and tell them that they will be watching some of those parts again. Have 2 general questions about the program, such as the following, printed on the board or on a chart:

a. What things must a jumper remember to do when jumping out of the airplane?
b. What gear must a jumper wear?

(Only a few questions are introduced in this section because each question has answers that are found over a number of script pages.)

Read the questions to the students and tell them that they will be looking for the answers to those questions as they watch the "Parachute" program. (Be sure to put questions in the order that the answers appear in the video tape.)

Read the first question again and direct students to read the captions and remember the answer. Stop the tape after teacher finishes the jumping procedures -- after the caption "I'll tell you what that was all about later." on p. 11. Have students describe the steps for jumping. (If students miss the steps, rewind the tape slightly , repeat the question and have the students again look for the answer.)

Repeat the above procedures of reading the question and having students look for the answer with question "b." Stop the tape after the caption "This feels pretty good." on p. 13 and discuss what gear is needed.

2. Using the Script to Locate Information from the Video (3-4 mins.)

PASS OUT THE SCRIPTS

Tell students that they will be using the scripts to locate answers that they just found in the TV program. (Even though students may know the answers to these questions, it provides them with an opportunity to transfer information they learned from the video to a reading situation. As a result, they have a successful reading experience.)

Read the first question students had previously answered, such as question "a." in the above section, and direct students to raise their hand when they find the complete answer. Tell students the answer is on p. 10 and 11. Have a student or students read the sentences that contain the answer.

Repeat this procedure with question"b.", telling students to look on p. 11-12 for the answer.

3. Locating Information in the Script and Writing Responses (5-8 mins.)

Tell students that they are getting so good at locating information that they now are going to hunt for new information. Give students the "PARACHUTING" question/answer sheets. Read the questions aloud (or ask students if anyone would like to read the first question aloud, second question, etc.). Have students then find answers in the script and write answers on their answer sheet. Have different students orally read their answers after each question or after all questions are answered. (If having students write answers is too difficult, just have students orally answer the question or read the answer from the script.)

4. New Information Discussion (5 mins.)

To provide closure for this lesson, engage the students in a brief discussion about the new information they learned about parachuting. To encourage discussion, you might share one new thing you learned about parachuting and then ask the students, "Did you learn anything new about parachuting?" Provide time for students to discuss their ideas. You may also want to ask if students had a chance to see the parts they liked best, referring to the parts they mentioned at the end of the first lesson on parachuting. If they have not seen their favorite parts, let students decide on one part they all really liked and show it to them. (Students may chose the final sequence where Tina jumps from the airplane -- p. 18 and 19 -- because it is not included in the viewing part of this lesson.)

NAME _____

"PARACHUTING"

1. Why is a jump suit bulky? (p. 9)

_____

2. How high will the airplane be flying for the jump? (p. 9 and 10)

_____

3. When the airplane door comes open, what holds it up? (p. 10)

_____

4. What are the chances that the main parachute won't open? (p. 12)

_____

5. Why must jumpers wear helmets? (p. 12)

_____

Lesson 1
Diff'rent Strokes
Script pp. 1-26
(17 mins.)

"The Van Drummonds"

Objective: Developing Prediction Skills

1. Viewing Introduction (2 mins.)

Provide students with a brief introduction to the program and a general viewing purpose. You might say, "We're going to watch part of a Diff'rent Strokes program. Have you ever seen any of these programs on TV?" (Accept answers -- explain that it is a program about the everyday life of the Drummond family in New York City. This family consists of a rich father who has three children, a girl and two adopted boys.) To set a general purpose for viewing you might say, "In the program we're going to watch today, the Drummond family has visitors. Let's watch the first 15 minutes of this program to see who the visitors are and what happens to them during their visit."

2. Viewing of First Segment (10 mins.)

Watch the first part of the tape until after the caption "Who dropped the water balloon?" on p. 16 of the script.

3. Prediction Activities with the Video (12-13 mins.)

a. Prediction 1 Ask students a prediction question, such as "What do you think the boys will say? Why?" In the discussion you can follow up on general purposes by asking questions such as, "Who are the visitors? What do you know about them so far?" After this discussion, ask the students again what they think the boys will say. Tell them to watch the next part to find out what happens.

View tape until p. 19 after the caption, "I have a wonderful idea."

Review students' predictions and ask students how the events in the story match the predictions they made.

b. Prediction 2 Tell the students to watch the tape to see what happens next. Watch until after the wine bottle is broken and Han's mother says, "What is this? You broke the bottle?" (p. 23.) Ask students a prediction question, such as, "What do you think the boys will say this time?" (If needed, remind the students to think about how each of the boys has behaved in the past --- such as Hans blaming Arnold for the water balloon problem.)

View tape again until the end to the wine scene on p. 26 after the captions (No. No, I couldn't.")

4. Reviewing Predictions with the Scripts (33-4 mins.)

PASS OUT SCRIPTS TO STUDENTS

Use the script to discuss what happened in the program related to the predictions students made. For example, you could direct students to turn to p. 23 where Han's mother says "What is this? You broke bottle?" and ask students to read until they find the caption that answers the question:

"Who was blamed for breaking the bottle?" (p. 24)

Discuss students' predictions and how they matched the events in the story. To bring out other information from the scene, you could ask students to find the caption(s) that answer the question:

"Did Cousin Anna like Willis and Arnold?" (p. 24)

After students find the answers on page 24, direct them to page 25. On this page you could ask:

"What is Willis going to tell his dad?" (p. 25)
and then
"Does Arnold like Hans?" (p. 25)

Provide time for students to locate an answer before asking a new question.

5. Concluding Activity (1-2 mins.)

To provide closure for the lesson, you could ask students what they think will happen in the last part of the program. For example, you could ask, "Do you think the boys will keep lying or 'covering up' for Hans?" Accept students' responses and tell students that they will find out what happens the next time they have TV reading.

Lesson 2
Diff'rent Strokes
"The Van Drummonds"
(last part)
Script pp. 26-34
(6 mins.)

"The Van Drummonds"

Objective: Developing Character Analysis Skills through Understanding Conflict and Resolution

1. Viewing Introduction (4 mins.)

Review some of the events of the program segment they previously saw by discussing problems the characters faced and how they resolved their problems. (For example, in the water balloon scene Hans was going to get in trouble for dropping the balloon, so he lied: Arnold was going to get Hans in trouble if he told the truth, so he took the blame.) As students mention the characters, write these names on the board. After recalling some of the events in the first part, ask the question you closed the previous TV lesson with, such as "Do you think the boys will keep lying or 'covering up' for Hans?" Direct students to watch the rest of the program to see if the boys continue to support Hans.

2. Start the tape at "Wake up, Philip" (script p. 26) or just a bit before this so the students know they haven't missed any part. Watch until the end of the program (script p. 34).

Briefly discuss what happened in the ending segment by asking questions such as, "What problem did Willis and Arnold face? How did they solve it? Would you have continued to support Hans?"

3. Identification of Characters (2-3 mins.)

PASS OUT SCRIPTS

Ask students who the major characters were in the story. Add to the list of character names you have already put on the board. To reinforce the names of the different characters, have students find their names in the script. Have students locate

some or all of the following names on p. 7.

Anna, Hans, Kimberly, Willis, Arnold,
Philip (Mr. Drummond is not written on this page.)

4. Character Analysis and Use of the Script (6-8 mins.)

Have a discussion about the personalities of the major characters, Hans, Anna, the boys, and Mr. Drummond. You might first ask students what words they would use to describe the characters. Write the words describing the characters next to their names. Ask students to support their answers with events or incidents they recall from the program.

Have students use the script to look for evidence to support the answers given for one character. Since this is a long script, direct students to a page or to a specific part of a page where they can look for support. For example,, if students say Anna is "stingy" or "cheap", direct them to a few of the following pages to find support for this description:

p. 7 (traded first class tickets)
p. 8 (gave shweezle sticks as presents)
p. 9 (gave air sickness bag as a present)
p. 9 (didn't want to stay in hotel suite)
p. 28 (gave Hans a quarter for video games)

Anna is mean:

p. 13 (beats Hans for watching TV)

Hans lies:

p. 17 (said Arnold did it [dropped the balloon])
p. 22 (said he was dusting it off [the wine bottle])
p. 31 (said he found the money)

5. Discussion of Personal Conflicts and Resolutions (5 mins.)

To provide closure for the lesson, have students discuss experiences they have had that have been like Han's or the boys' experiences. You might first want to share an experience you have had to let them know even teachers have had problems with lying or been in an awkward situation. Then ask a questions such as, "Have you had to lie because someone else lied?" or "Have you ever blamed someone else because you were afraid of getting in trouble?" Provide time for students to discuss their ideas. Discuss the problems of lying and how it sometimes gets you into more trouble than you planned.

APPENDIX C

Evaluation Forms
for
Objectives 5 and 8

TEACHER EVALUATION OF PREPARED LESSONS

NCI READING PROJECT

Lesson #_____ T.V. Program _____

Please check the appropriate column.	Not at all	Very little of the time	Some of the time	Most of the time	All of the time
	1	2	3	4	5
1. I followed the lesson plan.	___	___	___	___	___
2. I was comfortable with the equipment.	___	___	___	___	___
3. Students were on-task.	___	___	___	___	___
4. Students accurately responded during the lesson.	___	___	___	___	___
	Poor	Fair	Good	Very Good	Excellent
	1	2	3	4	5
5. Student interest in the lesson.	___	___	___	___	___
6. Teacher overall evaluation of the lesson.	___	___	___	___	___
7. Teacher overall evaluation of the lesson plan.	___	___	___	___	___

Comments (What did you like about the lesson? What did you change, or would you suggest changing about the lesson, and why? etc.)

Teacher #_____ No. of Students _____

School _____ Date _____

TEACHER GENERAL EVALUATION

Name_____

Directions: Please complete this evaluation before you begin to develop your own lessons.

NCI READING PROJECT
General Evaluation
Study A

		poor	fair	good	very good	excellent
1.	Student motivation	1	2	3	4	5
2.	Content of tapes (quality for instruction)	1	2	3	4	5
3.	Teacher general reaction	1	2	3	4	5
4.	Quality of learning	1	2	3	4	5

5. Which TV reading lesson did you like best?

   Lesson 1 2 3 4 5 6 7 8 (circle one)

   Why? _____

6. Which TV reading lesson did you like least?

   Lesson 1 2 3 4 5 6 7 8 (circle one)

   Why? _____

7. Which TV shows were best for developing reading skills?

   _____

8. Which TV shows did the students like best?

   _____

9. If you were not participating in a research project, how often would you use captioned TV lessons in your class?

   _____

10. How useful were the scripts in your captioned TV lessons? _____

_____

_____

11. Did you experience any difficulty using the TV and VCR? Yes____ No____.

If yes, please explain. _____

_____

12. Was the teacher training you received (Training for Study A) sufficient to enable you to use the prepared captioned TV lessons? Yes ___ No ___.
What would you add to or delete from the training program?

_____

_____

If time permits, please add comments about the benefits or problems associated with using captioned TV in the classroom.

Questions You Have About Closed-Captioned TV or
About Using Closed-Captioned Television Lessons

Please write any questions you would like answered about captioned TV programs, equipment, lessons, etc.

If you can remember, please write questions you had when you first started to use captioned TV lessons, equipment, etc.

TEACHER OBSERVATION FORM

_____
Observer Name/Date

CLOSED-CAPTIONED TV
TEACHER OBSERVATION FORM
STUDY A - 1986

Lesson #_____
CCTV program being used _____

Objective:

____ vocabulary

____ oral reading

____ prediction

____ locating information

____ other _____

Lesson starting time _____

Lesson ending time _____

Observation checklist

Using the following scale, please rate various aspects of the lesson.

	1	2	3	4	5
	no	a little	50/50	mostly	always
1. Teacher followed the plan					
a. _____	—	—	—	—	—
b. _____	—	—	—	—	—
c. _____	—	—	—	—	—
d. _____	—	—	—	—	—
e. _____	—	—	—	—	—
f. _____	—	—	—	—	—

	no	a little	50/50	mostly	always
2. Teacher used equipment easily	___	___	___	___	___
3. Teacher seemed comfortable with the lesson	___	___	___	___	___
4. Students responded accurately to the lesson	___	___	___	___	___
5. Students were on-task..	___	___	___	___	___

If off-task, explain why, if observable _____

_____

When the teacher changes the lesson from the lesson plan:

						N.C.
6. The teacher seemed more comfortable.....	___	___	___	___	___	___
7. The students improved their on-task behavior...	___	___	___	___	___	___

8. Please note the major changes teacher made in the lesson plan.

_____ _____

_____

_____

Overall evaluation	Poor	Fair	Good	Very Good	Excellent
1. Lesson plan	___	___	___	___	___
2. Student interest	___	___	___	___	___

_____

Teacher information:

Teacher number _____ Classroom _____ Resource _____ Wing _____

Classroom information: Group size _____

Student information: Age range _____ Rdg level range _____

APPENDIX D

TV Programs Used
in
Objectives 6 and 9

TV PROGRAMS USED IN
OBJECTIVES 6 AND 9

Ripley's Believe It or Not #57

The Littles "Twins"

Sesame Street #1995

3-2-1 Contact #208 "Sports Wednesday"

Scooby Doo "The Zombie"

Diff'rent Strokes "Arnold's Songbird"

3-2-1 Contact #236 "Building Monday"

3-2-1 Contact #212 "Flight Tuesday"

Scrappy Puppy "Mardi Gras"

Diff'rent Strokes "Van Drummonds"

APPENDIX E

Evaluation Forms
for
Objectives 6 and 9

TEACHER'S EVALUATION OF OWN LESSONS

NCI READING PROJECT - PART B

Lesson #_____ Date _____ T.V. Program_____

Major Objective:_____

Other Objectives:

___ vocabulary ___ comprehension (specify)_____

___ language structures ___ other (specify)_____

___ fluent oral reading

Procedures:
Briefly describe the steps of your lesson. (Please number your steps.)

Approximate length of lesson _____ This is the_____ (1st, 2nd, 3rd) time these students have used this program.

Please check the appropriate column.	Not at all	Very little of the time	Some of the time	Most of the time	All of the time
	1	2	3	4	5
1. I followed the lesson plan.	___	___	___	___	___
2. I was comfortable with the equipment.	___	___	___	___	___
3. Students were on-task.	___	___	___	___	___
4. Students accurately responded during the lesson.	___	___	___	___	___
	Poor	Fair	Good	Very Good	Excellent
	1	2	3	4	5
5. Student interest in the lesson.	___	___	___	___	___
6. My overall evaluation of the lesson.	___	___	___	___	___

Comments (What did you like about the lesson? Would you make any changes in the lesson? Why? etc.)

[Please write your comments on the back of this sheet]

Teacher # _____ School _____ No. of Students_____

TEACHER GENERAL EVALUATION FORM

Name _____

DOE Captioned TV Reading Project
General Evaluation - Study B

		Poor	Fair	Good	Very Good	Excellent
1.	Student motivation	1	2	3	4	5
2.	Content of tapes (quality for instruction)	1	2	3	4	5
3.	Teacher general reaction	1	2	3	4	5
4.	Quality of learning	1	2	3	4	5

5. What TV shows are best suited for instruction using captioned TV? Indicate your top 3 preferences.
1 = 1st choice, 2 = 2nd choice, 3 = 3rd choice.

___Ripley's Believe It or Not
___Sesame Street
___3-2-1 Contact
___Diff'rent Strokes
___Scrappy Puppy
___Other_____

6. What programs are least suited for instruction using captioned TV? Why?

_____

_____

7. Are you currently experiencing any difficulty using the TV and VCR? YES NO
If "Yes", please explain. _____ _____

_____

8. Captioned TV is suitable for the development of which skills?

___vocabulary
___locating information
___other _____
___prediction
___oral reading fluency

_____

9. Did you use the scripts in the captioned TV lessons you developed? YES NO

If "Yes", how valuable did you find the scripts to be in the lessons you taught?

little value some value very valuable

10. In the future, how often would you use captioned TV to teach reading related skills?

___not at all ___once a week ___2 or 3 times a week
___daily ___other _____

Teacher Training Information

1. Was actual training in the use of captioned TV necessary? YES NO

2. Could you have developed your own captioned TV lessons with only the captioned TV handbook and copies of samples lessons? YES NO

3. If you were planning a training program for teachers on how to use captioned TV in the teaching of reading related skills, which of the following would you include that training?

a. how to use the equipment (VCR & TV) YES NO
b. how to use the captioned TV handbook YES NO
c. how to use the prepared captioned TV lessons YES NO
d. have teachers use prepared lessons YES NO
If "Yes", how many lessons should they teach? Circle: 1 2 3 4 _____
e. how to teach specific reading skills such as vocabulary, prediction, etc. YES NO

What other elements would you include in training?

_____

_____

** We would genuinely appreciate your reaction to the benefits and/or problems associated with using captioned TV in the classroom. Please use the back of this sheet for your comments.

THANK YOU! THANK YOU! THANK YOU!

If we have further questions about captioned TV, may we contact you? YES NO

If "Yes" please write your home phone number _____

Observer Name/Date

TEACHER OBSERVATION FORM
STUDY B

Lesson #_____
CCTV program being used _____
This is the _____ (1st, 2nd, etc.) lesson with this segment/program.

Objective:

____ vocabulary
____ oral reading
____ prediction
____ locating information
____ other _____

Lesson starting time _____

Lesson ending time _____

Observation checklist

1. Was the lesson objective related to the development of reading skills? ___ No ___ Yes

2. Was there a match between the teacher's stated objective and the lesson you observed? ___ No ___ Yes

3. Were there reading activities to develop the objective? ___ No ___ Yes

   Write examples (No more than three)

   _____

   _____

   _____

4. Were video captions used in the lesson to develop reading skills? ___ No ___ Yes

   Check below:

   ____ Teacher told student to read captions while viewing.
   ____ Word identification.
   ____ Phrase identification.
   ____ Finding answers to questions.
   ____ Other _____

5. Did the students use the paper scripts of captions for reading activities? ___ No ___ Yes

Check below:

___ Oral reading.
___ Word identification.
___ Phrase identification.
___ Finding answers to questions.
___ Other _____

6. a. How much time did students spend on viewing TV? (Use a stopwatch). _____

   b. Was a purpose set for viewing? ___ No ___ Yes

   c. Was there any follow-up to purposes set? ___ No ___ Yes

7. a. How much time did students spend on re-watching a TV segment? (Use a stopwatch). _____

   b. Was a purpose set for re-watching? ___ No ___ Yes

   c. Was there any follow-up to purposes set? ___ No ___ Yes

Using the following scale, please rate various aspects of the lesson.

	1 no	2 a little	3 50/50	4 mostly	5 always
8. Teacher used equipment easily	___	___	___	___	___
9. Teacher seemed comfortable with the lesson	___	___	___	___	___
10. Students responded accurately to the lesson	___	___	___	___	___
11. Students were on-task..	___	___	___	___	___

If off-task, explain why, if observable _____

_____

Overall evaluation	Poor	Fair	Good	Very Good	Excellent
1. Reading lesson	___	___	___	___	___
2. Student interest	___	___	___	___	___

Comments (Use the other side of the page if necessary)

_____ _____

Teacher information:
Teacher number _____ Classroom _____ Resource _____ Wing _____
Classroom information: Group size _____
Student information: Age range _____ Rdg level range _____

Name_____

Age_____

CAPTIONED TELEVISION PROJECT

Student Questionnaire

Circle the best answer.

	Not at all	Very little of the time	Some of the time	Most of the time	All of the time
1. Did you like watching captioned TV programs?	1	2	3	4	5
2. Did watching captioned TV help you learn words?	1	2	3	4	5
3. Did watching captioned TV make script reading easier?	1	2	3	4	5
4. Would you like to learn with captioned TV again in school?	1	2	3	4	5

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