PROGRAMMED INSTRUCTION FOR DEAF CHILDREN

by

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STATEMENT BY AUTHOR

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Head, Department of Special Education

May 13, 1969
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ABSTRACT

A revolution in Deaf Education has been taking place for the past decade. One of the most fascinating ideas is use of programmed instruction to teach particular words and concepts. Enthusiasts for this method of teaching proclaim many advantages: (1) self-pacing; (2) small steps; (3) immediate feedback; and (4) an element of success.

These claims require careful inspection and evaluation. The need for research gave impetus to this study. The effect of programming one segment of knowledge on the learning retained by a population of deaf children has been explored. The results are both exciting and challenging.
CHAPTER I

INTRODUCTION

Educators of the deaf are continually searching for improved methods of teaching word meanings and an understanding of the concepts these words convey. This difficulty the deaf experience with vague word meanings and improper concepts results in a nearly insurmountable problem when the deaf learn to read. Being unable to conceptualize even commonplace ideas, the deaf child is handicapped in deriving meaning from what he reads.

Speaking to the Forty-Second Convention of the American Instructors of the Deaf, Doctor stated, "All of us in schools for the deaf know that the deaf pupil rated low in paragraph meaning. . . . One reason for this is the inability of the average deaf student to comprehend the reading material in the average textbook."¹

Myklebust further established that by the time the deaf child completes his regular schooling he is retarded seven to eight years in reading. This deficiency in reading experienced by the pre-lingual deaf child increases with age, a trend which is opposite to that found for the hearing.²

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Authorities in the field agree that concept building is primary. The child must visualize the meaning contained in the reading. It is rather easy to teach deaf children to match words and learn nouns. The real test is to teach concepts. Recent literature reflects an interest in programmed teaching of particular concepts as an aid to the deaf child who is learning to read.

Statement of the Problem

In a given population of deaf students, will programmed instruction of particular words and concepts result in a greater understanding of the words and/or a broader insight into the concepts? Will use of programmed instruction result in economy of learning time?

Résumé of Related Literature

As early as 1925 Thompson suggested the importance of accurately illustrating and scientifically organizing instructional materials in deaf education. This research remained obscure until 1964 when Exceptional Children, Official Journal of the Council for Exceptional Children, NEA, published the findings.

Mounting interest in deaf education prompted the U.S. Department of Health, Education and Welfare to fund Project LIFE in 1965. Language curriculums were investigated and existing methods were supplemented


with programmed instruction.\(^5\) Further research indicates written language can be improved by programming.\(^6\) Amcoff feels that the communality of linguistic skills should be utilized by the teacher. Material programmed for silent reading and speech perception helps in other areas such as written language.\(^7\) Speaking to all areas of special education, Johnson states, "In the school of the future each child will progress with his own program of instruction at his own speed limited only by his own capabilities."\(^8\)

Research conducted by Birch and Stuckless indicated no significant differences in language acquisition when written language was programmed. However, a savings in learning-time was reported.\(^9\) Similar results were reported by Neyhus who used a loop film to drill words and phrases in speech reading. No significant differences in speech-reading ability accrued, yet economy in time-spent was realized.\(^10\)

---


Statement of the Hypotheses and Deduced Consequences

The following hypotheses gave order and direction to the study: (1) use of programmed material designed to teach the meaning and use of the prepositions "under" and "over" will result in greater retention of learning than results noted by the same teachers when using a more traditional method of teaching the deaf child; and (2) use of programmed material will result in economy of learning time.

Motivation for this study was activated by the conviction that improved methods can be found to teach word meanings and concepts to the deaf child. The small steps of programmed instruction provide the necessary repetition. The ideas to be taught are not hampered by extraneous ideas that distract and confuse. The feeling of success, rarely experienced by the deaf child, lends high interest and enthusiasm to the learning. Thus fortified with useable language the child has the visual imagery necessary to comprehend the printed page.

This study was limited to programming two prepositions only, in order to strengthen the statistical evidence and enable the teachers to make more accurate evaluations. It is the hope of the author that conclusions drawn from this study will lead to additional programming of suitable material for the deaf child. The deaf child thus will be enabled to develop some facility as he learns to read.

Assumptions Underlying the Hypotheses

It was assumed that the experimenter, who is the author of the programmed instruction, had reasonable skill in writing the program in
question. It was further assumed that interest and enthusiasm for the procedures would be maintained throughout the testing period by both the students and the teachers. A review of recent literature established that programmed instruction for hearing children had been confirmed to be a valuable vehicle of learning.

Definition of Terms

(1) The deaf. Those whose hearing loss has precluded normal acquisition of language.11

(2) Solid learning. Learning that is retained over a long period of time and is so established as to apply to various situations.

(3) Programming. Learning sequences consisting of very small steps.12

(4) Recall Test. A test in which the child must use the powers of recall to furnish both the word and concept in question.

(5) The program. The booklet of programmed instruction designed by the author.

(6) Frame. The smallest segment of a program requiring a written response and supplying immediate feedback to the learner.


CHAPTER II

METHOD

Subjects

Subjects for this research included thirty-seven students attending the Arizona State School for the Deaf and the Blind (Department for the Deaf). The test population falls into the following categories:

1. Class A—oral students in the second year of school,
2. Class B—non-oral students in the second year of school,
3. Class C—first year students,
4. Class D—multiply-handicapped students from 9-13 years of age,
5. Class E—multiply-handicapped students from 14-19 years of age.

Although these five classes differed in ages and in language ability, the same test procedure was followed for each class. However, the tests were administered at different points in time.

While each class provided important information to the research, comparison was not made between the classes. Instead, intra-related observations of shifts in learning were evaluated. Retention of a segment of learning acquired through programmed instruction was contrasted to segments of previous learning acquired through a more traditional method.

Class A, second year oral students, consisted of six boys and two girls ranging in age from seven to eight years. Five of the eight children had had pre-school training. The hearing losses in the speech
range varied from 65 db. loss in the better ear to no response in either ear. The language ability of this class was judged to be above average by teacher observation. Seven of these children could learn auditorily as well as visually. This class was used in the pilot study (to be discussed in detail in the following section) in addition to the testing procedure.

Class B, second year students who were non-oral, was composed of five girls and three boys, ranging in age from seven to nine. None of these students had attended pre-school. Hearing losses in the speech range varied from 75 db. loss in the better ear to no response in either ear. Only three of these subjects could learn auditorily as well as visually. Teacher observation ranks these children as having average language ability.

Class C, the first year class, was composed of five boys and two girls ranging in age from six to eight years of age. Five of these children had had pre-school training. Hearing losses in the speech range varied from 57 db. loss in the better ear to no response in either ear. The teacher rating of the language ability of this class ranked them above average. Five of the seven children could learn auditorily as well as visually.

Class D, multiply-handicapped students from 9-13 years of age, had other problems in addition to deafness such as cerebral palsy, partial vision, retardation, and epileptic seizures. Hearing losses in the speech range varied from 72 db. loss in the better ear to no response in either ear. This class had virtually no language ability. One child appeared to learn some things auditorily.
Class E, multiply-handicapped students from 14-19 years of age, were late starters in school, some in their first year of formal schooling. This class had additional complications of cerebral palsy, mental retardation, visual impairment, and general health deficiencies. Hearing losses varied from 53 db. loss in the better ear to no response in either ear. These students had very little language ability.

The students from the first and second year classes were chosen at random from the group of students who did not already know the prepositions "under" and "over." The two classes of multiply-handicapped subjects were used in the study to determine if programmed learning might be adapted to these children's needs. The classes were in no way competing with each other. Statistical evidence and learning evaluation reflected only an inclusive report of the class under observation.

Procedure

Before studying the effects of programmed instruction on the learning of deaf students, the validity of the program in question had to be established. The programmed booklet, with original drawings, had been written by the author of this thesis, but had not been tested. Therefore, a pilot study to determine the efficiency of the programmed booklet, as well as student-teacher reactions to the program, was conducted during a period of sixteen days, January 13 to January 28, 1969. Class A, oral students in their second year of school, were used in this pilot study.

The pilot study followed a four-step process: (1) a two-frame introductory booklet, (2) a four-frame pre-test, (3) the thirty-four
page programmed instruction booklet of "under" and "over," and, (4) a four-frame posttest.

Each child was individually observed by the experimenter while performing the written task of completing the frames required to finish the four stages of the pilot study. Detailed notes were taken on each response made by each child. An analysis of this data at a later date determined the needed revisions and additions before the experiment could begin.

Indications of trouble spots led to five revisions in format and to four additional frames. Therefore, the pilot study lists thirty-four frames while the experimental program has thirty-eight frames. In all other respects the pilot study and the experimental program were the same. The format of testing was exactly the same for both studies.

The children were introduced to the program by a two-page booklet (see Figure 1). This served to condition the child regarding what was expected of him. Since the task was simple enough for almost any of the subjects to accomplish, the introduction created a climate of success. Children unable to complete the introductory frames were dropped from the experiment.

Next, the pretest was given to each child. The purpose of having a pretest was to ascertain how much knowledge, if any, the subject had of the words and concepts in question. The last four frames of the program made up the pretest booklet (see Figure 2).

Immediately following the pretest, subjects were given the programmed booklet. The same two introductory frames used in the conditioning process also introduced the experimental program (in pocket).
This is a ___.

This is a ___.

FIGURE 1

INTRODUCTORY FRAMES TO CONDITION THE CHILD
Frame 35

The boys and girls play London Bridge. They walk ______ the arms.

Frame 36

The car went ______ the bridge.

FIGURE 2
PRETEST FRAMES
Frame 37

The girl looked _____ the fence.

Frame 38

The boy looked _____ the fence.

FIGURE 2 (continued)
The thirty-eight frames of the program were designed to bring success to the learner. Each step was small enough and clues plentiful enough to ensure positive results. The subjects were instructed to look at the reinforcing answers found on the back of each page and to correct any mistakes as the work progressed. When unsure of the response or unable to spell the words, subjects were instructed to go back a page or two to find the answer. The experimenter concluded through observation that no harm was done by permitting subjects to check answers as they wrote each frame. Even when the child prematurely unfolded the flap which revealed the answer, learning took place.

Thirty-two of the thirty-seven subjects used in this research were able to fill in the correct responses from frame thirty-two to thirty-eight without hesitation. By the time they had reached this stage of the program, they were confident that they knew the answers and no longer needed to look back to find the correct response. Each class had one child who referred to the concealed answer for every response. This did not prevent the child from learning, however, as indicated by the posttest results.

The classroom teachers reported that the children attended to the program with a high rate of interest and enthusiasm. All but one child were motivated to finish the entire thirty-eight frames. The satisfaction of success seemed to be a self-motivating factor that spurred the subjects on at a faster and faster rate of speed.

The recall test was given as a final test of retained knowledge. A blank sheet of paper with a one sentence directive was given
each child. The directive called for the subject to draw a picture, i.e., "Draw: The moon over a house," (see Appendix).
CHAPTER III

PRESENTATION AND ANALYSIS OF EVIDENCE

Results of this effort relied equally upon statistical evidence and teacher observation. The significance of this study centered on retention of words and concepts as taught by programmed instruction. The ability to use the words and concepts in spontaneous conversation was considered valid evidence of learning. The economy of time spent on learning these words and concepts was considered valuable information by the author.

Analysis of the statistics indicated retention of learning. However, evidence indicating the ability to use the words in new and different situations depended on teacher evaluation. Time spent learning the words and concepts was clocked and these figures were statistical evidence. The intra-comparison of time spent in teaching with a programmed booklet in contrast to traditional teaching depended on teacher observation. Therefore, the results of both statistical evidence and teacher observation will be used in this analysis.

Statistical Evidence

Class A, the oral group of second year students, was used in the pilot study. The fastest child completed the entire process in 10 minutes while the slowest child took 35 minutes. Six of the eight children
made no omissions nor incorrect responses. A posttest was given eight days after the initial exposure to the program (see Table 1).

All of the children used in the pilot study also were given the revised program at a later date. In most instances the children asked for another program to do. Four additional posttests were given at eight-day intervals (see Table 2).

Next the program was presented to a non-oral class of eight deaf children, referred to previously as Class B. The fastest child completed the program in 10 minutes; the slowest child took 20 minutes. A posttest was given seven days later with correct responses from six out of the eight subjects. The two children who had difficulty were given the program again. The recall posttest was given during the following week with all the children making correct drawings (see Table 3).

The investigator anticipated problems with Class C. This was the first year in school for these children and their reading ability was limited. Since the curriculum guide included these concepts with the first year work, the seven children in this class were given the program. Unexpected results indicate that programmed learning is not limited by reading ability (see Table 4). The fastest child in this group completed the program in 20 minutes; the slowest child took one hour. A posttest was given six days after initial exposure to the program. Three children knew the words and concepts without hesitation. Four children were given the program a second time. They were able to do the program in less time and without checking back for correct answers.
### TABLE 1

**THE PILOT STUDY, CLASS A**

<table>
<thead>
<tr>
<th>Sex</th>
<th>Age</th>
<th>Test Time</th>
<th>No. Correct Responses</th>
<th>No. Incorrect Responses</th>
<th>Omissions</th>
<th>Desire to Correct Mistakes</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>7</td>
<td>25 min.</td>
<td>31</td>
<td>3</td>
<td>--</td>
<td>--</td>
<td>Correct</td>
</tr>
<tr>
<td>F</td>
<td>7</td>
<td>35 min.</td>
<td>31</td>
<td>2</td>
<td>1</td>
<td>--</td>
<td>No Response</td>
</tr>
<tr>
<td>M</td>
<td>7</td>
<td>25 min.</td>
<td>34</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>Correct</td>
</tr>
<tr>
<td>M</td>
<td>7</td>
<td>20 min.</td>
<td>34</td>
<td>--</td>
<td>--</td>
<td>Yes</td>
<td>Correct</td>
</tr>
<tr>
<td>M</td>
<td>8</td>
<td>10 min.</td>
<td>34</td>
<td>--</td>
<td>--</td>
<td>Yes</td>
<td>Correct</td>
</tr>
<tr>
<td>M</td>
<td>8</td>
<td>12 min.</td>
<td>34</td>
<td>--</td>
<td>--</td>
<td>Yes</td>
<td>Correct</td>
</tr>
<tr>
<td>M</td>
<td>7</td>
<td>15 min.</td>
<td>34</td>
<td>--</td>
<td>--</td>
<td>Yes</td>
<td>Correct</td>
</tr>
<tr>
<td>M</td>
<td>7</td>
<td>15 min.</td>
<td>34</td>
<td>--</td>
<td>--</td>
<td>Yes</td>
<td>Correct</td>
</tr>
<tr>
<td>Sex</td>
<td>Age</td>
<td>No. of Times Took Program</td>
<td>4-page Posttest</td>
<td>Recall Test</td>
<td>1 Month Posttest</td>
<td>Recall Test</td>
<td>Teacher Observation</td>
</tr>
<tr>
<td>-----</td>
<td>-----</td>
<td>---------------------------</td>
<td>----------------</td>
<td>-------------</td>
<td>----------------</td>
<td>-------------</td>
<td>---------------------</td>
</tr>
<tr>
<td>F</td>
<td>7</td>
<td>3</td>
<td>2 wrong</td>
<td>Correct</td>
<td>Correct</td>
<td>Vague results</td>
<td>Has trouble with reversals.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(with help)</td>
<td></td>
<td></td>
<td></td>
<td>Knows concepts.</td>
</tr>
<tr>
<td>F</td>
<td>7</td>
<td>4</td>
<td>2 wrong</td>
<td>No response</td>
<td>Incorrect</td>
<td>Correct (with help)</td>
<td>Knows concepts and words under pressure.</td>
</tr>
<tr>
<td>M</td>
<td>7</td>
<td>2</td>
<td>Correct</td>
<td>Correct</td>
<td>Correct</td>
<td>Correct</td>
<td>Solid learning.</td>
</tr>
<tr>
<td>M</td>
<td>7</td>
<td>2</td>
<td>Correct</td>
<td>Correct</td>
<td>Correct</td>
<td>Correct</td>
<td>Solid learning.</td>
</tr>
<tr>
<td>M</td>
<td>8</td>
<td>2</td>
<td>Correct</td>
<td>Correct</td>
<td>Correct</td>
<td>Correct</td>
<td>Solid learning.</td>
</tr>
<tr>
<td>M</td>
<td>8</td>
<td>2</td>
<td>Correct</td>
<td>Correct</td>
<td>Correct</td>
<td>Correct</td>
<td>Solid learning.</td>
</tr>
<tr>
<td>M</td>
<td>7</td>
<td>2</td>
<td>Correct</td>
<td>Correct</td>
<td>Correct</td>
<td>Correct</td>
<td>Solid learning.</td>
</tr>
<tr>
<td>M</td>
<td>7</td>
<td>2</td>
<td>Correct</td>
<td>Correct</td>
<td>Correct</td>
<td>Correct</td>
<td>Solid learning.</td>
</tr>
</tbody>
</table>
TABLE 3

EXPERIMENTAL PROGRAM, CLASS B

<table>
<thead>
<tr>
<th>Sex</th>
<th>Age</th>
<th>Test Time</th>
<th>No. Correct Responses</th>
<th>No. Incorrect Responses</th>
<th>Omissions</th>
<th>Posttest 7 Days Later</th>
<th>Recall Test 14 Days After Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>7</td>
<td>10 min.</td>
<td>37</td>
<td>--</td>
<td>1</td>
<td>All Correct</td>
<td>Correct</td>
</tr>
<tr>
<td>F</td>
<td>7</td>
<td>13 min.</td>
<td>37</td>
<td>--</td>
<td>1</td>
<td>All Correct</td>
<td>Correct</td>
</tr>
<tr>
<td>F</td>
<td>8</td>
<td>13 min.</td>
<td>38</td>
<td>--</td>
<td>--</td>
<td>All Correct</td>
<td>Correct</td>
</tr>
<tr>
<td>M</td>
<td>8</td>
<td>17 min.</td>
<td>38</td>
<td>--</td>
<td>--</td>
<td>All Correct</td>
<td>Correct</td>
</tr>
<tr>
<td>F</td>
<td>7</td>
<td>18 min.</td>
<td>37</td>
<td>--</td>
<td>1</td>
<td>1 Wrong</td>
<td>Correct</td>
</tr>
<tr>
<td>F</td>
<td>8</td>
<td>20 min.</td>
<td>37</td>
<td>--</td>
<td>1</td>
<td>All Correct</td>
<td>Correct</td>
</tr>
<tr>
<td>M</td>
<td>8</td>
<td>15 min.</td>
<td>35</td>
<td>2</td>
<td>1</td>
<td>All Correct</td>
<td>Correct</td>
</tr>
<tr>
<td>F</td>
<td>7</td>
<td>18 min.</td>
<td>37</td>
<td>1</td>
<td>--</td>
<td>2 Wrong</td>
<td>Correct</td>
</tr>
</tbody>
</table>
### TABLE 4

**EXPERIMENTAL PROGRAM, CLASS C**

<table>
<thead>
<tr>
<th>Sex</th>
<th>Age</th>
<th>Test Time</th>
<th>No. Correct Responses</th>
<th>No. Incorrect Responses</th>
<th>Omissions</th>
<th>Posttest 7 Days Later</th>
<th>Recall Test 14 Days After Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>6</td>
<td>30 min.</td>
<td>38</td>
<td>--</td>
<td>--</td>
<td>All Correct</td>
<td>Correct</td>
</tr>
<tr>
<td>F</td>
<td>6</td>
<td>45 min.</td>
<td>38</td>
<td>--</td>
<td>--</td>
<td>2 Wrong</td>
<td>Correct</td>
</tr>
<tr>
<td>M</td>
<td>6</td>
<td>20 min.</td>
<td>38</td>
<td>--</td>
<td>--</td>
<td>All Correct</td>
<td>Correct</td>
</tr>
<tr>
<td>F</td>
<td>6</td>
<td>35 min.</td>
<td>34</td>
<td>1</td>
<td>3</td>
<td>2 Wrong</td>
<td>2 Wrong</td>
</tr>
<tr>
<td>M</td>
<td>7</td>
<td>30 min.</td>
<td>38</td>
<td>--</td>
<td>--</td>
<td>1 Wrong</td>
<td>Correct</td>
</tr>
<tr>
<td>M</td>
<td>6</td>
<td>60 min.</td>
<td>38</td>
<td>--</td>
<td>--</td>
<td>All Correct</td>
<td>Correct</td>
</tr>
<tr>
<td>M</td>
<td>8</td>
<td>35 min.</td>
<td>36</td>
<td>1</td>
<td>1</td>
<td>2 Wrong</td>
<td>2 Wrong</td>
</tr>
</tbody>
</table>
Class D, six multiply-handicapped deaf children, were given the programmed instruction. These children have a short attention span coupled with many factors that impede the process of learning. The children took from 20 to 40 minutes to complete the program. One subject stopped working at frame 19. A posttest was given seven days later. Two of the children responded quickly and well; the other four children had forgotten during the seven day interval, so the program was repeated for them. The recall test was given seven days later. Three of the children gave correct drawings (see Table 5).

Class E, the multiply-handicapped children from 14-19 years of age, was also given the programmed procedure. These subjects were just learning to read. Some question was raised regarding the value of the study because of the limited reading ability. As in the previous observation with the first year class, limited reading ability did not deter learning of these particular words and concepts when presented in programmed form. Because of numerous distractions and absences, the subjects in this class were given the program on different days and the time required was not clocked (see Table 6).

**Teacher Evaluation**

The investigator felt solid learning had been established when the children used the words in conversational speech. Other teachers observed the children recognizing "over" and "under" in the reading materials and filmstrips. Children used the words in their written work.
<table>
<thead>
<tr>
<th>Sex</th>
<th>Age</th>
<th>Test Time</th>
<th>No. Correct Responses</th>
<th>No. Incorrect Responses</th>
<th>Omissions</th>
<th>Posttest 7 Days Later</th>
<th>Repeat</th>
<th>Recall Test 14 Days After Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>13</td>
<td>45 min.</td>
<td>19</td>
<td>--</td>
<td>19</td>
<td>No Response</td>
<td>Yes</td>
<td>No Response</td>
</tr>
<tr>
<td>F</td>
<td>10</td>
<td>30 min.</td>
<td>35</td>
<td>2</td>
<td>1</td>
<td>2 Wrong</td>
<td>Yes</td>
<td>No Response</td>
</tr>
<tr>
<td>F</td>
<td>9</td>
<td>35 min.</td>
<td>38</td>
<td>--</td>
<td>--</td>
<td>Correct (with help)</td>
<td>Yes</td>
<td>Absent</td>
</tr>
<tr>
<td>M</td>
<td>10</td>
<td>20 min.</td>
<td>37</td>
<td>--</td>
<td>1</td>
<td>Correct</td>
<td>No</td>
<td>Correct</td>
</tr>
<tr>
<td>M</td>
<td>10</td>
<td>20 min.</td>
<td>37</td>
<td>--</td>
<td>1</td>
<td>Correct (with help)</td>
<td>Yes</td>
<td>Correct</td>
</tr>
<tr>
<td>M</td>
<td>10</td>
<td>30 min.</td>
<td>38</td>
<td>--</td>
<td>--</td>
<td>Correct</td>
<td>No</td>
<td>Correct</td>
</tr>
<tr>
<td>Sex</td>
<td>Age</td>
<td>No. Correct Responses</td>
<td>No. Incorrect Responses</td>
<td>Omissions</td>
<td>Posttest</td>
<td></td>
<td></td>
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</tr>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>16</td>
<td>38</td>
<td>--</td>
<td>--</td>
<td>Correct</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F</td>
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<td>38</td>
<td>--</td>
<td>--</td>
<td>Correct</td>
<td></td>
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</tr>
<tr>
<td>M</td>
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<tr>
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<td>--</td>
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<td></td>
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<tr>
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<td>35</td>
<td>3</td>
<td>--</td>
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<tr>
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<tr>
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<td>--</td>
<td>Correct</td>
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</table>
The classroom teacher of the multiply-handicapped class of young children had expressed a great degree of skepticism before the experiment started. The experimenter and teacher discovered, however, that the program elicited response from children who previously had shown no academic interest.

The teachers were asked to compare the learning time required in using the programmed instruction with previously taught words and concepts using other methods. All of the participating teachers indicated that learning took place much faster using the programmed instruction.

Another observation made by the teachers was that interest and motivation were noticeably increased while using the programmed booklet.
CHAPTER IV

SUMMARY AND DISCUSSION

Restatement of Problem and Procedures

This research has been concerned with the value of offering new words and concepts to young deaf students in a programmed instruction form. Thirty-seven students attending the Arizona State School for the Deaf and the Blind (Department for the Deaf) were used to test a program written by the experimenter. The program was designed to teach the prepositions "under" and "over."

The method of presenting the program had five basic steps:

1. an introductory booklet to acquaint the subject with procedure,
2. the pretest, which was a four-page booklet designed to reveal any prior knowledge of the words to be tested,
3. the thirty-eight page booklet of pictures and sentences with fill-in blanks,
4. the posttest, a four to six page booklet without the reinforcing answers, and
5. the recall test, requiring the subject to recall from memory the concept and the word.

The thirty-seven subjects came from five dissimilar classes of deaf children. Each subject was only in competition with himself, however. The individual progressed from frame to frame through the booklet.
at his own rate of speed. Success was built into the experience by
graduating the learning sequences by such minute degrees that confusion
was minimized for even the slowest learner. Immediate feedback from
the reinforcing answer appeared on the back flap of each frame to keep
the child from learning an incorrect response.

In some instances the program was given a second time. Two or
three posttests were given to check on retention.

Findings and Conclusions

It was hypothesized that use of programmed material by deaf
children would result in retained learning that would become useable
language. This hypothesis was strongly supported. The children re­
tained the learning without formal drill. The children used the words
at the proper time and place. The fact that the subjects used the
words in various situations indicated that solid learning took place.

It was also hypothesized that use of programmed material would
result in economy of learning time. This hypothesis also was strongly
supported. Observations made by the teachers indicated that time spent
learning these words and concepts indeed was less than that spent learn­
ing a similar set of prepositions in a traditional manner.

All of the teachers expressed enthusiastic endorsement of the
program and requested further material. The children readily gave up
free time and play time to work on programmed instruction.

A teacher reported the following anecdote: While working on
the verb "found," the class played a game of hiding objects in the
room. One child was peeking when the teacher hid the ball under the
desk. While another child was looking for the ball, the first child ran to the board and wrote "under" and pointed to the desk. Another day a different child in this class was delighted to understand the meaning of "over" in the command: "Jump over the paper."

Another teacher remarked that the words seem to have real meaning for the children when they appear in stories, filmstrips, songs and movies. The word "under" was noticed to be contained in the word "understand." An airplane was noticed to be flying "over" the trees. One child noticed the word "under" in his teacher's name, Funderburg.

In further use of this program, the experimenter suggests care be exercised to ensure that subjects understand what is expected of them. The introductory booklet could be expanded to include four or six frames.

The response made by the multiply-handicapped classes indicated the need for further research in this area. It is hoped this research will prove helpful in fostering use of programmed instruction for education of the deaf on a much larger scale.
APPENDIX
APPENDIX

RECALL TEST

DRAW: A boy walking over a bridge.

DRAW: A dog under a bus.
DRAW: The sun over the water.

DRAW: The moon over a house.
DRAW: A boy under an umbrella.

DRAW: A bird over a tree.
SELECTED REFERENCES


Programmed Instruction for the Prepositions - OVER & UNDER

Arizona State School for the Deaf and the Blind Tucson, Arizona

Mae E. Evans, Coordinator
This is a _ _ _ _ cat.
This is a bird.
Frame 1
This is a bar.
Frame 3

The scene involved an effort to cross a bar.
Write: over ___ ___ over
The boy jumped over the bar... over
The boy jumped over the bar.
The boy jumped _ve_ the bar.
The boy jumped _ _ er the bar. _ _ over.
The boy jumped over the bar.
The boy jumped over the bar.
Frame 12

under

under
Write: under

under
The boy ran under the bar.
Frame to

unde_

under
The boy ran under the bar.
Frame 18

The boy ran under the bar.
The boy ran under the bar.
The boy ran and the bar.
The boy ran _____ the bar.  under
The boy jumped ___ ___ the bar. over
Jack jumped over the candle.
The cat went __________ the chair.  under
The ball rolled ___ the car. und
The cow jumped over the moon.
The doll is ___ ___ the bed. unde
The boy swims underwater.
The bus went... the bridge... und
Birds fly ______ the rainbow. over
The girls hold hot dogs over the fire.
The ball is _____ the swing.
The girl is under the umbrella.
The boys and girls play London Bridge. They walk ______ the arms.
The car went ___ the bridge.
The girl looked under the fence.
The boy looked over the fence.